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Agriculture

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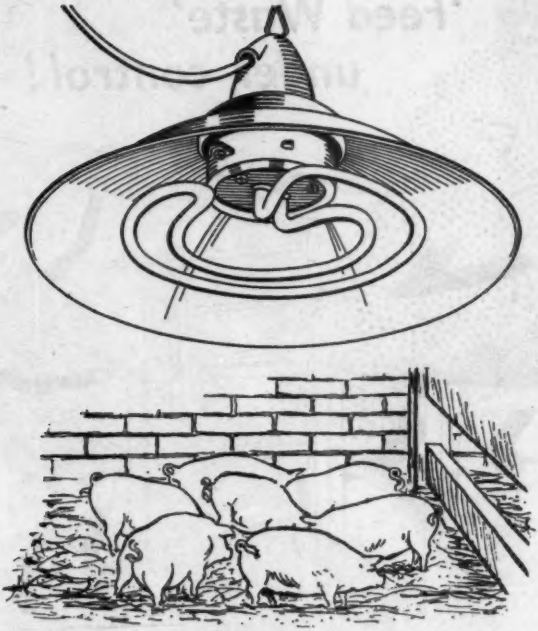

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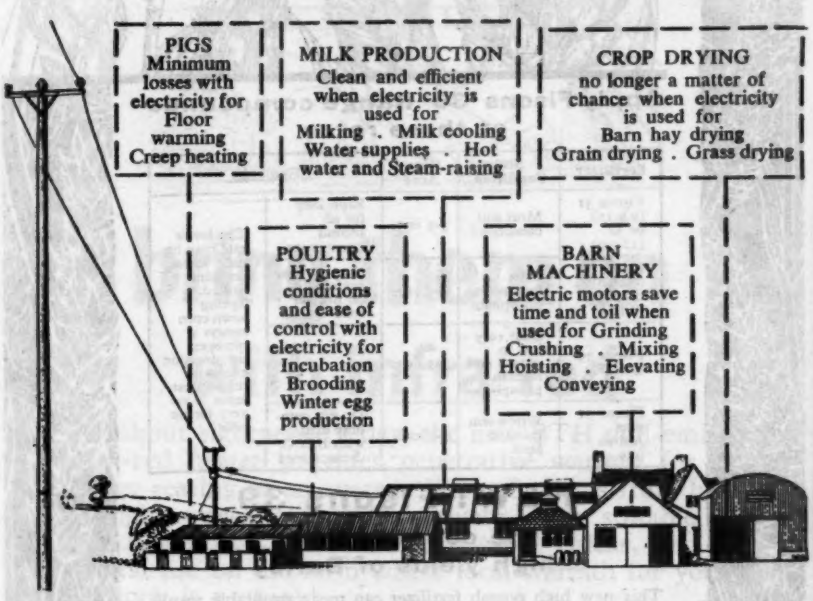
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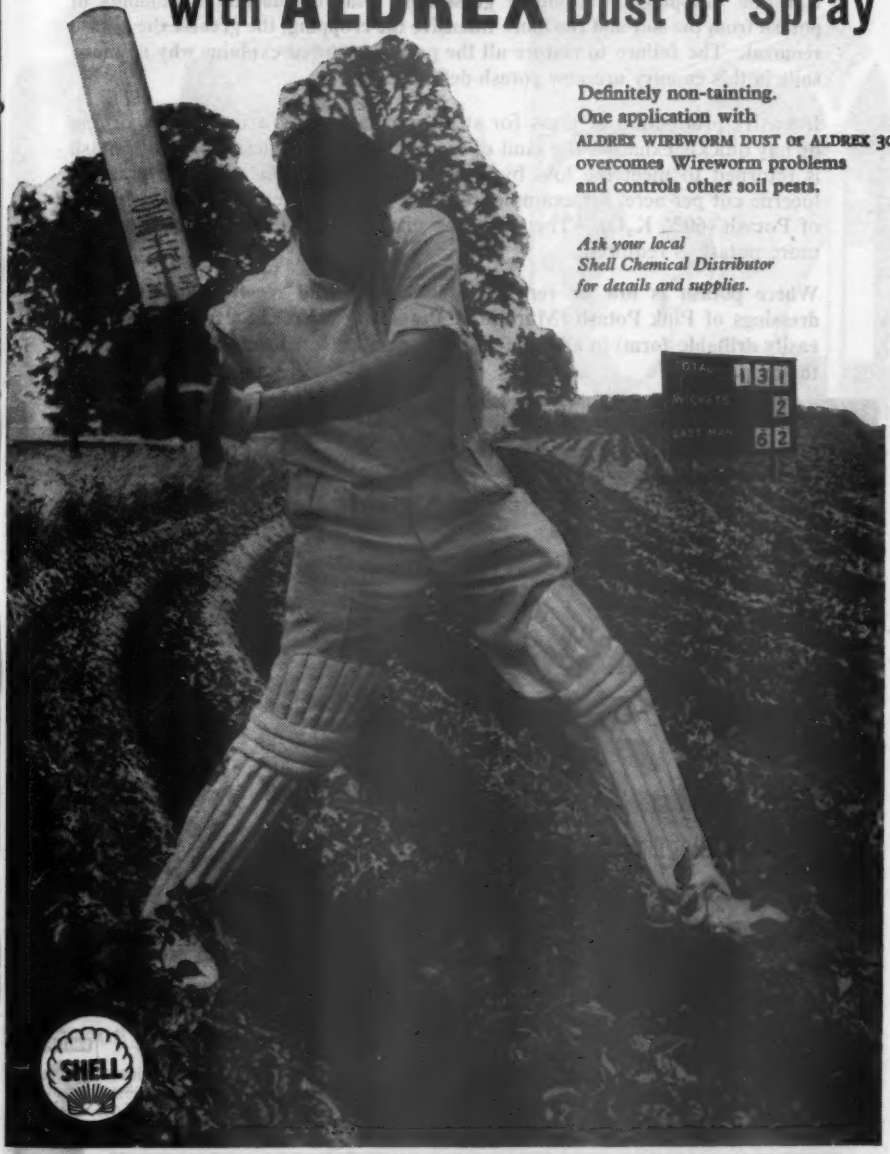

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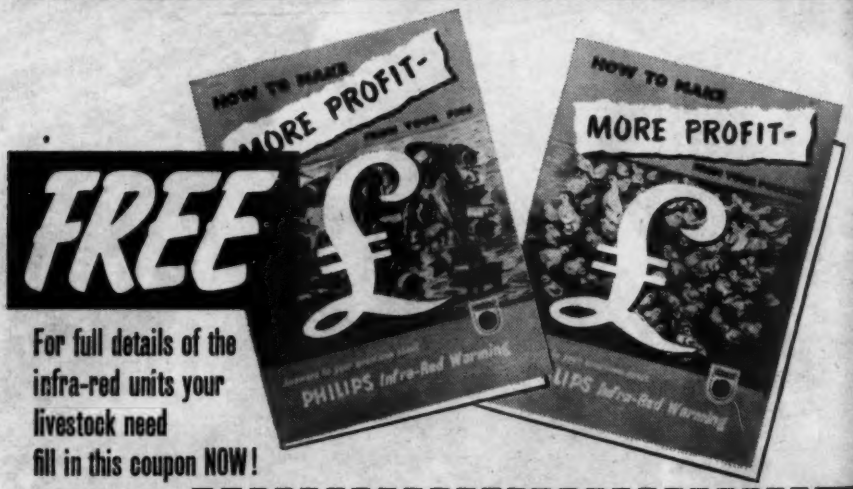

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AGRICULTURE

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EARLY STAGES IN LEY ESTABLISHMENT

D. J. COLUMBUS JONES, M.Sc.

National Agricultural Advisory Service, South-Eastern Province

A succulent, well-knit young ley will quickly repay all the attention it has been given. But for the best results, it is essential that the sward should have a good start, and here the writer calls attention to the points of management which can make or mar in the establishment stages.

A WELL-ESTABLISHED ley is not only a source of pride to the owner, it is an asset to better production over its entire lifetime. But, like any other crop, grass needs care and attention to ensure good establishment. Too often weaknesses in establishment are overlooked in the hope that, given time, the sward will develop satisfactorily. Indeed, it would not be overstressing the situation to say that a high proportion of our leys up and down the country show a weakness of some kind in establishment. Improve they well may, but the delay in attaining top production from them will have meant the loss of a lot of good food in the interim.

Despite the considerable advancement in mechanization and in our knowledge of cultivations over the last few years, a common cause of unsatisfactory results in establishment is still the unsuitability of the seedbed prepared for the small seeds of grasses and clovers. The first consideration is the fertility and cleanliness of the soil. It is helpful to know the past history of the field in regard to its cropping capacity and the prevalence of weeds, for then cultivation can be organized to deal adequately with the difficult weeds which may be present, such as couch, agrostis, docks, etc. Time and thorough cultivations will be needed to work out and destroy them. Annual weeds, as charlock, fat-hen and chickweed, may also retard the development of the ley by their early smothering effect. Topping over with a mower, or even spraying, is helpful, but a good deal can be done to check these weeds when the seedbed is being prepared. A delay of a week to ten days is often sufficient to allow the bulk of the annual weeds to germinate, and a light harrowing at this stage can be most effective.

Opportunity should be taken during cultivations to attend to the fertility by applying lime and fertilizers. The manurial requirements will, of course, depend on the natural level of soil fertility, but some guidance on this can be gained from chemical analysis. In practice, very few soils are capable of meeting the demands of a good grass sward without generous fertilizer treatment. In the critical early stages the ley should be adequately provided with nitrogen, phosphate and potash, and this often means dressings of the

order of 1-2 cwt nitrogenous fertilizer, 2-3 cwt superphosphate and ½-1 cwt muriate of potash per acre.

Another important consideration is that the final tilth should be even and fine and the soil underneath well consolidated. Care in achieving this end is always worth while, even if it means spending longer on the job. If cultivations are rushed without due regard to consolidation at the right time, soil moisture may be lost, and this will lead to slow, uneven germination of the seeds. The state of the seedbed can also have a very marked effect on the even covering of the seed; it is much easier to regulate the distribution and depth of sowing if the bed is in good condition.

The techniques of sowing grass and clover seeds have not advanced much in the last 20-30 years. Broadcasting methods of sowing vary from district to district, but they still leave a lot to chance in the covering and placing of the seed. The wetness of the soil surface in relation to broadcast covering is important, as the small seeds tend to cling to damp soil particles, so making covering operations more difficult. Broadcasting on a ring-rolled surface has the advantages of ensuring better covering and placement of the seeds, since they drop into the corrugations left by the roller rings. Drilling has the advantage that the seed can be regulated more accurately to soil conditions, but even so, the ordinary type of corn drill, which is widely used for sowing grass and clover seeds, is not ideal for the task. One of the difficulties generally encountered is that of adjusting the drill to sow the small quantities of seed per acre required in grass and clover seed mixtures, and it is often necessary to mix the seeds with inert material such as sawdust, dried bonemeal, etc., to increase the bulk. The combined seed-and-fertilizer drill is popular for corn and it is also useful for drilling ley mixture seeds. The placement of part of the appropriate fertilizer dressing with the seeds helps establishment, and the drill can cater for the separation of constituents into heavy and light seeds for more accurate sowing. The heavier seeds can be added to the fertilizer in the fertilizer box, the rest being placed in the seed box.

Is Undersowing Worth While? The traditional method of establishing a ley is by undersowing the seeds mixture in a corn cover crop. Satisfactory results are usually obtained, but the practice has many disadvantages which are inherent in trying to get the best results from both crops. In the first place, there are difficulties in adjusting cultivations to suit both; in the second place, there is a keen competition between the cover crop and the undersown seeds for light and nutrients.

If winter-sown corn crops are undersown in the following spring, the practical difficulties of obtaining a sufficient surface tilth to cover the grass and clover seeds adequately may result in some injury to the brairded corn crop. In such cases, establishment is generally best achieved if the top growth is either grazed or mown, and the seeds are cross-drilled with a disc coulter drill.

With spring-sown corn cover crops it is important to sow the seeds of grasses and clovers *at the same time* as the corn, or at least immediately afterwards. When a disc coulter drill is used for the corn, a good coverage of the ley seeds can be obtained by broadcasting them in front of the drill. If sowing is delayed until the corn has brairded, the success of the ley is problematic. The practice of delayed sowing was originally planned to avoid the ryegrasses and red clovers developing too strongly and hampering harvesting operations, but it certainly does increase the percentage of establishment failures, and in cases of long leys containing no red clover or ryegrass, it often results in poor establishment.

The usual recommendation for a corn cover crop is to select a stiff-strawed, early-maturing variety and reduce the rate of seeding by ½-1 bushel per acre. Although helpful to the undersown ley, there is no guarantee of good results. The reduced rate of seeding of the corn is likely to encourage better tillering and may lead to higher yields. Moreover, many of the newer varieties, apart from being heavy yielders, also leaf up early, thus adding to the smothering effect on the undersown seeds.

How the yields of the cover crop can affect the eventual establishment of the ley is shown by the following table, which summarizes the results of a survey on a range of crop yields.

Yields of Barley (*per acre*)		Establishment of Undersown Seeds		
		30 cwt and under	30-37 cwt	37 cwt and over
1956	Grasses	Good	Fair	V. poor
	Clovers	Good	Poor	V. poor
1955	Grasses	Good	V. fair	Fair
	Clovers	Good	Poor	Poor

In 1955—a dry season—yields of over 37 cwt per acre from the barley cover crop resulted in a failure in the establishment of both grasses and clovers. More favourable results were seen in the wet season of 1956, particularly for grasses, but the clover establishment still suffered considerably with the higher yields. In badly-lodged cover crops the undersown seedlings were completely smothered in every instance.

A critical period in the development of undersown seeds is during the last month before harvesting, for the drawn and spindly growth of the undersown seedlings at this stage is very susceptible to any deterioration of conditions. Thinning out of stands at this time due to drought or lodging can be serious. It is in these circumstances that cover crops which are cut earlier for silage or hay are an advantage in ensuring a better "take" of seeds.

A Crop in its Own Right Direct seeding without a cover crop is being adopted increasingly on many farms where grass is treated as a crop in its own right. Direct seeding allows full scope to ensure good establishment both in regard to cultivations and management. The risks inherent in undersowing are eliminated and the chances of maintaining satisfactory leys from the outset are considerably enhanced.

Direct seeding is, of course, often avoided because of the loss of return from the corn cover crop, but against this other aspects have to be considered. In the seeding year valuable grazing will be obtained from maiden leys at a time when other grass leys are on the wane. It is also a well-established fact that grazing young seeds gives added stimulus to milk production. And undoubtedly the most important factor in the economy of the grassland farm is to have a well-established ley ready for full production in the spring, thus ensuring the basis of a sound rotation of grass on the farm. Failure or partial failure of seed takes, which are especially common in drought years with undersowing, can create a major disturbance in the planning of rotations and upset the general economy of the farm.

The most appropriate time for direct sowing of leys is the early spring. But, under certain conditions, and especially where it may be necessary to clean the land a little more, late summer sowing of leys can be recommended. There is every chance of good establishment, especially if a rye-grass seeds mixture is used. Delaying sowing beyond the end of August, however, lessens the chances of a good clover take.

Selecting the Seeds Mixture Seeds mixtures play an important part in the establishment of leys, but the choice available is wide enough to meet practically any circumstances of soil, purpose and management. The important factors from the point of view of establishment are seed rate, depth of sowing and the relative aggressiveness of the species or strains included.

The seed rate per acre can easily be varied and controlled to suit conditions. However, the general tendency is towards lower rates than in the past, particularly when the simpler mixtures and higher tillering leafy strains are selected. The following are typical examples of modern mixtures:

	lb per acre
(a)	
Perennial ryegrass S.24	8
Perennial ryegrass S.23	8
White clover S.100	2
	18
(b)	
Timothy S.48	4
Meadow fescue S.215	4
Meadow fescue S.53	4
White clover S.100	2
	14

The depth to which grass and clover seeds are buried is important, since species vary in the covering they need. The range of optimum covering depths is as follows*:

Species	Depth *in.*
Ryegrass	½–1
Cocksfoot	½–1½
Meadow grasses	½–1½
Red clover	½–1½
Timothy and white clover	½–1

Thus with a complex seeds mixture it may be difficult to ensure a sowing depth suitable for all the species included. Fortunately the tolerance is wide enough in most cases to meet practical conditions, the chief danger being that species requiring very shallow covering may be buried too deep, thus preventing their proper establishment.

The relative aggressiveness of species has also to be considered in the blending of seeds mixtures. In the early establishment phases certain species will quickly make themselves evident and may tend to crowd out others. When, for example, ryegrass is sown in large quantities in a mixture, it will dominate the "take" in the early stages and check the establishment of the less aggressive species such as cocksfoot, timothy and meadow fescue. In view of this, seed rates of less than 6-8 lb cocksfoot, 4 lb timothy and 8 lb meadow fescue will seldom succeed in competition with 14 lb ryegrass. For good results with the relatively less aggressive and slow-developing species, it is necessary to cut down the seed rate of the ryegrass or omit it entirely from the seeds mixture (as in example (b) above).

It will be found that the most satisfactory results from undersowing are obtained with predominantly ryegrass mixtures, and as the trend towards non-ryegrass mixtures increases, the problem of getting good takes from undersowing becomes even more acute.

* Methods of Covering Grass and Clover Seed. R. D. WILLIAMS. *J. Min. Agric.* 1922-23, **29**, Part I, 53-60; Part II, 132-7.

Management in the Early Stages Undersown leys need immediate attention following the harvesting of the cover crop. Avoid leaving a long stubble, either by setting the combine cutters as low as possible or by following with a mower. Loose straw and stubble cuts should be removed immediately after harvest. Power choppers and spreaders have been used on some farms to dispose of the loose straw and stubble, but even so the retarding effect on the undersown seeds has been very noticeable. At this critical stage it is very important to do everything possible to encourage the development of the young seedlings, and a fertilizer dressing containing the equivalent of 1-2 cwt nitrogen, 2 cwt phosphate and ½-1 cwt potash will help matters considerably.

The management of the developing young ley will vary according to its type and purpose, but in the early months management should be directed to encouraging a strong initial sward cover. Leys which are to be left down for a number of years should be grazed with stock as soon as possible, and the grazing should be so regulated that the animals are on it only for limited periods. Treading by stock and light grazing will help the tillering and the thickening of the sward.

In favourable years like 1956, many new leys established well and were in a very forward condition by early winter. This excess of growth may be difficult to cope with at the time when grass is generally plentiful. However, many farmers successfully cut this surplus for silage, and the removal of the excessive top growth in this way has certainly benefited the sward. Where the heavy top growth has been allowed to remain, the dense mat of winter browned material has retarded the progress of fresh spring growth and the development of a well-knit sward.

Leys sown direct without a cover crop are usually ready for a light grazing about 6-8 weeks after sowing. Where there is a strong top growth of annual weeds, it may be necessary to top over with a mower before grazing and remove the surplus cut material.

New leys are often put up for hay in the first season, but a better alternative for the well-being of the ley would be a cut for silage. If hay is taken, the field should be cut as early as possible (thereby sacrificing yield) and followed by controlled aftermath grazing. A heavy hay crop in the early stages of development of a ley will naturally retard the young clover plants and grasses, like timothy and meadow fescue, and will also tend to shorten the useful life of a long-term ley.

★ ***NEXT MONTH***

Some articles of outstanding interest

Concentrate Spraying by M. H. MOORE • **Selective Weed Control with MCPB** by PROFESSOR R. L. WAIN • **Higher Agriculture Education** by PROFESSOR A. N. DUCKHAM • **Spray Drift** by J. R. MACDONALD • **Oxford Farming Conference** by L. W. TOLLADAY.

QUALITY BULKS IN QUANTITY

P. A. NAYLOR, DIP. AGRIC., N.D.A.

National Agricultural Advisory Service, Eastern Province

Experience on Hertfordshire dairy farms has shown that, given proper management, those undeveloped acres of grassland around the farmstead can often provide the bulky quality foods needed to cut the concentrates bill.

THE term "quality bulks" is being increasingly applied to home-grown foods such as good leafy grass, kale, silage, sugar beet tops and, very occasionally, super hay. These foods, which have a high protein content, are all capable of supporting milk production when fed to a dairy cow, and they are all natural, health-giving and often milk-stimulating. But to get good value from quality bulk foods in milk production they *must* be fed in large quantities, whereas on most farms they are fed merely as supplements or extras to the same old ration of hay and concentrates. Investigation usually shows that they are looked upon solely as part of the maintenance ration, and that concentrates are fed for all milk produced. This means that the real value which quality bulks might contribute is discounted and often their cost is begrudged. And because they are fed so meagrely, little of their merit as milk producers is known. In many cases, too, fear of disturbing the accepted system keeps them undiscovered.

One difficulty that faces the practical man who may not have all, or indeed any, of the quality bulks, is how to fit them into his pattern of farming. There will always be lingering doubts and suspicion that a lot of effort may produce little (financial) gain. A farmer with a system established is naturally loath to launch out into the unknown, particularly if he finds on inquiry that there are conflicting opinions as to how best the desirable quality bulk foods may be supplied.

Such problems have, in fact, faced us in the heavy land dairying area of Hertfordshire on the London fringe, but by patient trial and error a system has been evolved to allow the gradual introduction of quality bulks and their continuing supply without too many attendant headaches, bringing, at the same time, the certainty of reduced costs and consequently greater profit.

Look to the Home Fields On many dairy farms there is a large area of "undeveloped" grassland close to the homestead which is often extensively managed and poor in production. Further away from the homestead some control over grass is more usual, for at least it can be shut up for mowing, and, on the larger farms, there may also be some cash cropping interspersed with leys of various types. It was the existence of this kind of situation in Hertfordshire which prompted us to tackle the job of providing more quality bulks by improving the grass production from the fields near the homestead.

The first rule was "divide before you multiply". The large area of grass was divided into fields by making good fences or using a semi-permanent electric fence. This gave the farmer a chance to control grazing and provide for adequate rest. Following this, came pioneer cropping and reseeding piece by piece. The pioneer crop was deemed necessary to get good conditions for the final reseeding, but it was invariably found that this first crop—usually rape and Italian ryegrass—was a tremendous producer in itself.

Indeed, as a provider of good early keep, the Italian ryegrass could not be beaten, even by the leys that followed it. Yields of 250 or more gallons of milk per acre from one grazing in the early spring were obtained regularly, and the starting date was usually at least two weeks in advance of the previous average. Kale, too, was tried as a pioneer crop and gave heavy and relatively weed-free crops. Having it close to home was a distinct advantage and usually grazing was found to be practicable.

The way was now thought to be clear for the establishment of the new and more productive leys, but as the pioneer cropping was squeezed out by the new leys the kale and ryegrass were missed, despite the good production from the new grass. Removing the kale and ryegrass to the outer fields spoiled the ease of handling, and the distance meant a falling off in efficiency of utilization, mainly because the fields were no longer under the master's eye. An attempt was made to take two fields near the homestead and alternate kale and ryegrass on them, but this proved less than satisfactory, since it reduced the kale to the status of a catch crop after the "early bite". Moreover, seedbed conditions were often unkind, and if dry weather followed, this meant a much reduced crop. Nevertheless, enough experience was gained from these efforts to show that something of this sort had distinct possibilities. There were also secondary benefits, the main one being that leys further from home got adequate rest in the autumn and were not needed in the early spring, so that they could be put up for mowing. Thus another of the quality bulks—silage—could be supplied.

The Cow-keeper Rotation From these exploratory techniques developed the final system, which is known as the cow-keeper rotation or the "cow shift". It entails utilizing three fields or paddocks near the homestead, approximately equal in size and each containing about ¼ acre for every cow in the herd. These fields are cropped in turn with kale, followed by two years Italian ryegrass.

After the kale grazing is finished, the land is ploughed, and 25-30 lb per acre of Italian ryegrass is sown as soon as conditions permit in the following spring. Because the ryegrass has to last two years, a persistent strain is recommended, and today that means S.22 (H.1 ryegrass is not recommended because its winter hardiness is suspect). This ryegrass, with suitable fertilizer treatment plus a wireworm control if necessary, gets off to a good start and gives several good grazings during its first summer, particularly if strip-grazed with a back fence. It has proved especially valuable in a dry spell, for if it is kept grazed and not allowed to run to seed, it will provide abundant keep—a fact noted about maiden sowings many years ago. The only essential feature of management in the sowing year is a rest in September, followed by one further grazing to trim off excess growth. The rest is essential to stimulate early growth in the second spring, and with this in mind the final grazing should not be prolonged.

Management is conventional in the second year: an early application of nitrogenous fertilizer is followed by strip grazings and the mowing of any surplus. The ryegrass will cease growing in July, but in a normal year it will give some further worthwhile grazing in the autumn. It can be used subsequently as a stamping ground for the cows going into the adjacent kale, before being dunged some time during the winter and ploughed ready for sowing to kale in the third year.

Simple and Profitable The practical advantages of this system have proved to be many. But first and foremost is its simplicity. There is comparatively little to go wrong as the succession is automatic, and

no complicated machinery or vast understanding of grassland management is needed. The last point is important, for the ordinary farmer generally has little time to delve deeply into the apparent mysteries of grassland management. The system also provides a level amount each year of the vital necessities—good, early, sustained grazing with milk-stimulating qualities, midseason anti-drought grass, late grazings of grass and kale. And all are within easy reach where control can be properly maintained.

It has been found that the ½ acre per cow of ryegrass in this system, together with ¼ acre or less per cow of permanent grass lay-backs, will provide nearly all the grazing needed for the season. In the spring flush there may often be a surplus to mow, and leys elsewhere can be shut up in the certainty that they can be cut—preferably for silage. Some of the aftermath of the silage cut can be offered as clean grazing if the build-up of dung on the "early bite" paddock, as the result of repeated strip grazings, becomes a nuisance. This paddock can then be put up for cutting late hay. The intensive stocking of the ryegrass, plus its easy access for dunging from the buildings in its last months, is ideal for the kale crops, and the usual troublesome weeds that appear in kale are killed by grazing and mowing in the first year of the ryegrass.

It is obvious that the provision of large amounts of quality bulks by this system involves spending more on fertilizers, seed, fencing, fuel, etc. But these costs are always well outweighed by the increase in income from milk or from land released to cash cropping, not to mention the cut in total costs as a result of using less bought feeds. The likely effect of such a change can easily be budgeted for any particular holding.

The theoretical possibilities of this system are that a cow and her share of the necessary followers (1 calf, 1 yearling, 1 in-calf heifer per five or six cows) can be carried on two acres or less. Thus the annual milk sales per cow divided by two gives the gross output per acre of the land devoted to livestock, and this can easily be £50 per acre, and might be as much as £70. It can reasonably be expected that the continuing supply of quality bulks will support, on average, a genuine 1½ gallons of milk per cow per day, or 450 gallons per year, leaving the rest to be got by concentrates. This might, of course, be only a pious hope if the average method of utilization is no better than that discovered by a survey of feeding practice in Gloucestershire.* It is certain, however, that with the *ad lib.* feeding of quality bulks which the system makes possible, considerable savings in concentrates *can* be achieved.

It must be remembered that bulks are always credited with the easiest gallons to get—in other words, the first one or two. The next one or two are harder to obtain, and certainly after the third gallon the 4 lb concentrate allowance is inadequate, although the calculations of the effect of concentrates nearly always assume this allowance.

If the quality bulks make the contribution we suppose, then we might expect a livestock *net* output (livestock sales minus purchases and purchased feed) of £32-50 per acre from cows alone, whereas at present this is the average obtained from *all* stock (including pigs and poultry) on the ordinary eastern counties arable dairy farm.

The introduction of the "cow shift" might help any farmer in a similar situation to those we have in Hertfordshire. With normal initiative and equipment he can increase his output or cut his costs, reduce his dependence on concentrate feedingstuffs, and leave a much larger slice of the farm income in his pocket.

* Do Bulk Foods Produce Milk? D. C. Barber, E. S. Carter and A. K. Giles. *Agriculture*, 1956, 63, 61-4.

LUCERNE STEM EELWORM

A SERIOUS THREAT TO LUCERNE GROWING

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Lucerne Stem eelworm is a new problem in Britain. It is very difficult to eradicate in the field and spreads quickly if neglected.

LUCERNE growing in England and Wales has increased apace from 30-40,000 acres before the war to its present 111,000 acres. Of these, about 50,000 acres are in the Eastern Counties, and when the value of lucerne as a high protein crop and for building up organic matter in light sandy soils becomes more widely recognized, the acreage is likely to increase still further. It is a crop which has been remarkably free from pests. The Pea and Bean weevil occasionally causes severe damage in the early stages of establishment, but this pest can easily be controlled with modern insecticides. But another pest, the Lucerne Stem eelworm (*Ditylenchus dipsaci* (Kühn) Filipjev), is now causing trouble, especially in view of the expanded acreage. It cannot at the moment be controlled in the field by chemical means.

Stem eelworm has long been known as a serious pest in most of the main lucerne-growing areas of the world, including New South Wales, South Africa, North and South America and on the continent of Europe. In many of these countries, particularly in areas of high humidity or rainfall, or where irrigation is practised, the spread of the eelworm can be very rapid. Sometimes the crop has to be ploughed up after only two or three years, instead of the more normal six or eight.

The first record of Stem eelworm on lucerne in this country was in 1948, when it was found in Essex[1]. Shortly afterwards, infestations were reported from Kent and Lincolnshire, and during the next five years five more infested fields were discovered in the Eastern Counties. From 1954 to 1956 a total of 70 infested fields were found, most of which were on the eastern side of the country. At this stage, it was realized that if no action was taken the eelworm might become a serious threat to lucerne growing, and a special study of the problem was therefore made.

Progressive Damage Normally the first sign of trouble in a lucerne field is seen in the early spring of the year following drilling, when circular patches, rarely more than about a yard in diameter, appear in the crop. These become evident as the surrounding plants grow away, leaving areas which look completely bare but, on closer inspection, are seen to contain stunted plants heavily infested with microscopic eelworms.

As its name implies, the eelworm lives and reproduces only in stem tissues; it does not attack the roots. Attacked plants have fat, swollen shoots which do not grow away normally and are often killed. As the first shoots die off, the plant responds by throwing up a large number of smaller shoots, which in their turn may also be killed. Often all that is visible of an attacked plant in the early spring is a mat of bunched shoots just above or even flush with the soil surface. The leaves on such plants are usually puckered and twisted; they may remain closed or half-opened and are often partly folded up concertina-fashion. As the eelworms multiply within the tissues, dead brown areas appear, and often whole shoots decay, releasing the eelworms

to attack other shoots. Some swollen shoots may partially recover, but they can always be recognized by their swollen bases. Later on in the season, swellings may frequently be found high up the stems of plants. Attacked tissues are always very brittle and break far more readily than normal growth.

Because of drought, during the summer of 1955 there was very little spread of eelworm. As the season progressed there was some recovery of the lucerne, especially in the centres of the patches. However, during the following winter and spring the eelworms spread in an alarming manner, the extent of which was not apparent until growth began in April. Patches which in the previous season varied from 1 to 3 feet in diameter now averaged 5-6 yards. By this time, they had lost their circular shape, due to the eelworms having been carried farther in one direction than in another—for example, in the direction of mowing. Some patches were 20-30 yards across and were probably formed by the coalescence of several smaller ones. These larger patches usually had numerous small patches dotted around them. Where the patch happened to be on a slope, the eelworms had often been washed by rain right down to the bottom, resulting in a long, narrow patch sometimes 50-60 yards long.

During the spring of 1956 the majority of attacked plants made a remarkable recovery, and by early June diagnosis of eelworm was not easy, even on fields known to be heavily infested. However, after the first cut was taken rain fell frequently and the eelworms again took their toll.

Undoubtedly the best time to examine fields for eelworm patches is in the early spring (April and early May), before there has been too much growth. Occasionally, immediately after a cut has been taken, the eelworm patches may show up as green areas in the crop, because the stunted plants and weed growth have been missed by the mowing machine.

A Recent Introduction An interesting feature of the earlier attacks was that where the source of the seed could be traced, it was found to be Hungarian. However, most of the later infestations have been in French varieties, particularly Du Puits, W.268, Chartainvilliers, Ile de France, Flandria and Flamande. The incidence of eelworm in fields of Provence—a variety still much in favour—appears to be much lower than in the other varieties. For example, in twenty fields of Du Puits inspected in 1956, eelworm was discovered in seven, whereas it was found in only seven out of sixty-one fields of Provence. And from the distribution and severity of attack in at least three of the crops of Provence, it seems fairly certain that the eelworm had been introduced from other infested fields. One particular field of Provence had fairly large eelworm patches down one headland where trailers filled with lucerne from fields known to be infested had been left standing.

The term Stem eelworm includes a number of specialized races, each of which attacks a fairly well-defined range of crops. These races cannot be distinguished even by microscopical examination, although they behave so differently in the field. Several races, such as those attacking oats and onions, red clover and narcissus, are common, but the eelworms from these plants will not damage lucerne. The only known crop hosts of the lucerne race are lucerne, alsike clover and sweet clover (*Melilotus alba* (Desr.)[3]. Alsike clover features to some extent in seeds mixtures, but sweet clover is not now grown as a crop in this country, although it has become a common roadside weed in some areas.

It seems clear that the eelworm is a fairly recent introduction into this country. We know that the eelworm is present in France, and it appears

certain that all the infestations so far recorded in this country have been seed-borne. The incidence of the eelworm within a field during the spring following drilling—circular patches up to a yard in diameter distributed at random throughout the crop—strongly supports this view. Each of these patches has probably arisen from one infested seed or piece of infested stem mixed with the seed. With well-established soil infestations, much larger patches would be encountered at this time. Further evidence is provided by 8 one-year-old fields of Chartainvilliers which were inspected during the spring of 1956. These fields were all drilled with the same stock of seed and were all infested to the same degree. There is published evidence from the U.S.A.[3] that the eelworms can be seed-borne, and I have recently demonstrated the presence of small numbers of Stem eelworms in a seed sample in this country. It would indeed be surprising if the seed from an infested field did not become contaminated. Even if the eelworms do not become attached to the seed coat, small pieces of stem tissue invariably get mixed with the seed during threshing, and it is impossible to get rid of all of this, no matter how thorough the cleaning process.

Field Eradication is Difficult It is known that Stem eelworm in onion and red clover seed can be controlled by fumigating with methyl bromide. Recent work by Dr. A. B. P. Page of Imperial College Field Station, Ashurst Lodge, Sunninghill, Berks, has shown that lucerne seed will tolerate far higher dosages of methyl bromide than is likely to be necessary to kill the eelworms. Fumigation should be done in a closed airtight container, and the concentration of methyl bromide and the exposure time must be under strict control.

The eradication of the eelworm from an infested field is extremely difficult. The only certain method is to plough up the field. However, this would be drastic treatment for a field which has a few scattered patches only, and hardly seems justified if there are any alternatives. The treatment of small infested patches in new stands with a flame-gun has been suggested in the Argentine[4]. This method has been tried here, but it has been only partially effective. To have any chance of success, it would need to be done as soon as it is possible to distinguish the eelworm patches in the spring—before there has been much growth. It is essential to burn off all the growth within the patch and up to 2-3 feet outside it. But burning alone will not kill the plants. To do this, it is essential to use the flame-gun as often as new growth appears, to kill the plants with a weed-killer (*after* flame-gun treatment), or to soak the area with a liberal amount of waste sump oil or similar material and set fire to it *before* using the flame-gun.

In the U.S.A. two varieties, Nemastan and Lahontan, have been bred for resistance to Stem eelworm. Unfortunately, American varieties are, generally speaking, not entirely suited to conditions in this country. However, if other measures of dealing with the pest are not taken or prove unsuccessful, the possibility of breeding resistant varieties in this country should not be disregarded.

Methods of Spread The eelworm will persist in a dried-up condition in lucerne hay for many months, although it is unlikely that it will remain alive in silage. This dangerous pest can therefore be spread in lucerne hay, but a more important way is in pieces of infested stem carried on harvesting implements, which are subsequently moved from one lucerne field to another. The fumigation of seed should therefore be accompanied by efforts to stop spread occurring in these ways. If one field on a farm is known to be infested and it is decided not to plough it up for

the time being, I suggest that all machinery is thoroughly hosed down to remove all traces of lucerne immediately after each cut has been taken. If possible, the crop should be made into silage, preferably on the infested field, or go for drying. If the crop is taken elsewhere, it is most important that it should not be carted across uninfested lucerne fields or any other fields likely to be drilled with lucerne in the near future.

Some Practical Measures Very little is known about the persistence of Stem eelworm in the soil after ploughing up the host crop. From our knowledge of other races of this eelworm, it seems unlikely to persist very long in light sandy soils, but it may be more persistent in the heavier land. However, as a large proportion of our lucerne is grown on the lighter soils, and since there is usually a break of at least 6-10 years between successive lucerne crops, this is unlikely to be a problem.

To sum up, I should like to emphasize the following points:

1. The fumigation of all lucerne seed would prevent infested seed from being planted. However, since methyl bromide is very poisonous, fumigation is a job for the expert, and to be effective it must be carried out in an airtight chamber under carefully controlled conditions.

2. Early recognition of eelworm damage is important. Farmers should therefore look out for patches in their lucerne fields in the early spring (April and early May). If the presence of eelworm is suspected, advice should be sought from the local district advisory officer of the N.A.A.S.

3. If infested fields are discovered, efforts should be made to prevent the eelworm from spreading to other lucerne crops.

If these measures are taken, it may be possible to eliminate this race of Stem eelworm entirely from this country.

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"Current Affairs"

A new film designed to show the value of electricity on the farm is available for showing from the British Electrical Development Association, 2 Savoy Hill, London, W.C.2. In telling the story of Tom Hunter and his problems and their solution, the film ranges over the other farms which he visits, where electricity is seen helping the farmer in many different kinds of ways. It contains a lot of information about the use of electricity on the farm, and, what is particularly noteworthy, never loses sight of the practicalities nor of the likely interest of the shrewd audience of farmers for which it is primarily intended.

Free. 35 *mm. or* 16 *mm. Running time:* 30 *minutes.*

ACCOUNTING, BUDGETING AND CONTROLLING

THE A.B.C. OF FARM BUSINESS MANAGEMENT

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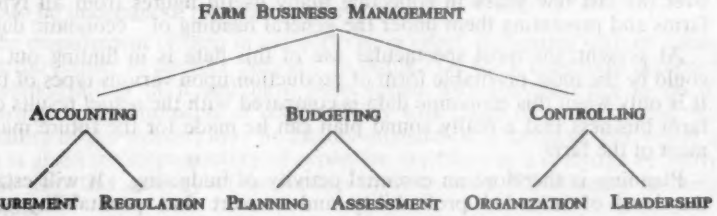
The farm is a business which, like any industrial undertaking, is managed through certain established principles. These principles, which have been applied to a small dairy farm, and latterly to a large arable farm, are outlined by this Gloucestershire farm manager.

IT is a fascinating feature of the English mentality that any change in outlook or revolution in practice is usually resisted at all costs. Only when the idea has run the gauntlet of derision and scepticism, and the pressure of the times forces its acceptance, is a change allowed to take place. It would not be too strong to say that the concept of farm business management is still groping for acceptance. Nevertheless it will eventually have to be recognized that farming consists of more than just growing good crops and raising fine stock. The farm must pay its way within the high cost structure of our industrial economy. Profit connotes that the farmer must understand the functions of business management.

Fundamentally, the activities of farm management fall under three main headings. First, there is the group associated with policy-making (budgeting); secondly, those associated with policy functioning (controlling); and thirdly, those associated with policy proving (accounting).

From these three simple headings emerge certain other factors of management, which can be shown in the form of a pyramid, thus:



Accounting Although accounting is such a necessary part of management, it never fails to frighten the average farmer. Its use has become perverted under the need of providing proof of income. This sad state of affairs deprives the business of vital information of its true financial health, and forbids any real effort to guide the fortunes of the farm. To start production, purchases of various kinds must be made. These purchases result in a flow of money off, and ultimately, it is hoped, back into the business. Therefore accounting must at first *measure* that flow of money.

The cash analysis method of accounting provides an adequate system of measuring the business of the farm, but whatever the method used, it is futile if done only on an annual basis. The usual procedure of loading the accountant with a mass of receipts and counterfoils may result in a document that satisfies the Inspector of Taxes, but if the farm account is no more than an instrument for assessing taxes, then it is useless to the farmer. For if the

farmer has no information about his current level of expenditure and receipts or, what is more important, the exact nature of receipts or expenses that have been rising or falling, he is also quite unable to perform the other essential activity of accounting—namely, regulation.

With the high level of payments that has become usual on most farms, some rein must be kept upon outgoings, not only that they are kept within the budgeted level, but also that they ultimately result in the expected income. Therefore, regulation, based upon the information revealed from up-to-date measurement of the money flow through the business, allows changes to be made to the budget. Any adverse changes in prices can be countered at once, instead of becoming a regrettable fact brought to light only when the annual accounts are perused.

Regulation acts upon the farm in two ways. First, there is the overall control of the general financial structure of the business; secondly, there is the close regulation that has to be kept over the various production units. The specialization of pig, poultry or milk enterprises into distinct units calls for accurate recognition of what is really being spent upon those lines, and whether the production from them is reaching the budgeted level and actually realizing the expected prices required to bring profit.

Briefly then, accounting is really an essential method of proving the policy of the business. It means that an accurate measurement can be made of the money flow through the business, and that the information so gained can be used to regulate the finances of the business in accordance with the intentions of the farm budget.

Budgeting The pivot of any farm business is budgeting, which sets out to show just what is required of the business during the ensuing period. It is recognized that budgeting is really a form of predicting events, but hazardous as that might seem, there are tools at hand today which enable such prediction to be fairly accurate. The economist has made great strides over the last few years in collecting many useful figures from all types of farms and presenting them under the general heading of " economic data ".

At present, the most spectacular use of this data is in finding out what could be the most profitable form of production upon various types of farms. It is only when this economic data is compared with the *actual* results of the farm business that a really sound plan can be made for the future management of the farm.

Planning is therefore an essential activity of budgeting. It will establish the level of intended profitability and convert that profitability to the necessary pattern of cropping and stocking. But such a plan must be subjected to an assessment of what the farmer really intends of his business. More than that, it is necessary to assess the farmer and his farm in their joint capabilities to give effect to that plan. A certain course of action might well give profit, but before it can be accepted it must, in the view of the farmer, conform to his ambitions and be within his own potentialities and that of his farm.

This attempt to divide the activity of budgeting into two parts focusses the attention upon the whole function of budgeting. Planning is only half the picture, and is that part which is most easily done. To ignore assessment is to leave out the human factor, and that, in any circumstances, is folly. Assessment may require a certain amount of heart searching on the part of the farmer, and a degree of tact and philosophy on the part of the consultant, but if it is accepted that farming is a business, then the objectives and potentialities of that business must be firmly established.

Controlling The art of controlling a farm has been almost ignored. It has been assumed to be entirely the prerogative of the farmer. The study of practical duties and the intelligent arrangement of farm events has received little attention, and the idea of the farmer recognizing his responsibilities as a leader in his own business has been barely mentioned. Yet in the successful controlling of a farm business two things—organization and leadership—are essential.

Organization is concerned with the events of the farm. It requires that the farmer decides just what will be the programme of happenings, and arranges them in a logical sequence. Such an arrangement might cover the ensuing year, month, week or day, but whatever the period, organization demands that the intentions of the various lines of production should be known, reduced to a programme, and then intelligently correlated so that they form a sequence to guide the farmer, rather than that he should have to rely upon instinct and intuition. When the programme has been truly arranged, the actual tasks upon the farm will have to be thought out.

From such thoughts about the various jobs will arise a method of doing them. In some circles this process is called work-study, but whatever the name given to it, what it means is that the farmer should know which man is suitable for which job, and be satisfied that the best and easiest way of doing that job has been found.

It is to be hoped that over the next few years more and more farmers will become aware of the appalling lack of programme formation and job analysis in the agricultural industry, and will become conscious of the saving in effort and fatigue which result from intelligent organization. When such studies have been accepted and the resulting opportunities to increase profit become apparent, the application of them will then have to be founded upon sound leadership.

There is nothing new about leadership. But if all the benefits of machines, and the full exploitation of economics is to be realized, then the principles of leadership, manifesting itself through delegation and supervision, will have to be understood, respected and applied.

The employment of men in any form is, in effect, delegating certain duties from the farmer to another person. In doing that work they have accepted the responsibility of it and have been vested with the authority to do it. Squaring the requirements of responsibility with those of authority and the mentality of the worker, may be factors unheard of in farming, but where a man is given the responsibility of expensive machines or has charge of costly units, then this activity of leadership must become a feature of farming thought.

All businesses require supervision, and that supervision stems from the farmer. He is the judicial body and law maker in his own business. So, therefore, in exercising supervision the farmer will have to be conscious of his need to establish a code of discipline and administer that code with all due respect to the feelings of equity. For no matter what may be his most innermost intentions, bit by bit the picture is gradually forming of the farmer's role as an industrial employer. It will be far better for him to recognize what is reluctantly being applied in industry and accept the true function of leadership, so that the traditional practice of fair play, inherent upon most farms, be continued and maintained.

More than Good Husbandry This approach to the function of farm management is intended to pin-point the salient features that should occupy the thoughts and actions of the modern farmer.

It is an attempt to move the perspective away from the narrow views of just plain husbandry, stockmanship, and economics, and to weld them into a single feasible pattern. Other names may be put to the various activities mentioned, but, fundamentally, the basic approach will lie along the paths of accounting, budgeting and controlling. The ideas expressed in this article have been submitted to the test of farming practice, but they were originally inspired from a study of industrial management. Of course, industry has its companies and boards, whereas the farm is usually a one-man business, so that much of the findings of industry in the field of management are not directly applicable to agriculture. Nevertheless, the principles are common to both.

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HIGH EGG PRODUCTION AND THE SMALL FLOCK

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The results of an experiment with backcrossing at the Poultry Research Centre suggest a method by which the small flock-owner can maintain a high level of egg production, even though he has to buy in from outside males of a quite unknown strain.

THERE is no doubt that it is the breeder with the flock too small to close who has most difficulty in finding a breeding system for improving egg production, or maintaining it at a high level. No matter how carefully he selects his female breeders, there remains the question mark against the brought-in male. Will he help or retard progress? In many cases, the use of an outside male amounts to a strain cross, and good results will depend on his "nicking" with the home females.

Theorists deduce that for successful crosses the two strains used must differ in some of their hereditary complement. One can look at a cross as an attempt to collect the best combination possible of supporting genes, so that the other genes directly concerned with egg numbers will be allowed to express themselves fully with the bird having internal organs capable of standing the strain of high production. In general, however, there is no way of recognizing whether the right genes are there before the mating is made, so each successive introduction into a one-sire flock is very much a hit-or-miss affair.

It is in this connection that some results of an experiment, now under way at the Poultry Research Centre, seem worth reporting. They are by no means the answer to the problem, but they do suggest that there may be a way of introducing outside males annually into a small flock and still maintaining some control over performance.

The Theory The experiment in question was rather unorthodox. It was designed to test whether a high rate of production* was behaving as a simple dominant in a cross between two of the Centre's inbred lines of Brown Leghorns. It seemed unlikely that this was the situation, but earlier work had suggested that it might be.

* High rate refers to the ability to lay in long sequences, or to give a high percentage production when pauses are discounted.

Because of the environmental variability to which the laying cycle is subject, it is not possible to identify all individual high-rate birds; some may actually do badly if they have frequent pauses superimposed on their basic rate. Thus the theory could not be tested simply by raising a second-cross generation and looking for a 3:1 ratio. But if a backcross to the low-rate line were made, then roughly half the birds would be expected to be heterozygous (carrying a high- and a low-rate gene) and to produce as well as the high-rate line. The other half would be pure low rate (two low-rate genes), so that together their average rate should be intermediate between those of the parent lines.

By selecting females showing a high rate from the first backcross, and mating them also to low-rate males, the result should again be the same. Therefore, if the rate of production were behaving as a simple dominant, one should be able to carry on the process indefinitely. If not, the crosses would become progressively more like the lower rate line in performance. This would be true not only for rate but also for actual egg production, for the hybrid vigour gained by the introduction of different sets of supporting genes in the first cross would also become dissipated in succeeding generations.

The Unexpected Result That briefly was the argument, but experiments rarely go exactly according to plan. In this case, the results were not even bad: they were unexpectedly good. First-year records are now available for three backcross generations. They are summarized in the accompanying table, along with comparable data for pullets of the two parent lines.

	Hatched	High Rate	Low Rate	Backcross
Twelve months hen-housed production ...	1952	212	156	204
	1953	199	176	232
	1954	208	164	222
Egg weight (*oz*)		1¼	2¼	2
Body weight (*lb*)		3¼	4¼	4
Mortality (*per cent*) ...		8	25	5
Pullet replacements per year		42	86	22

It is clear there that the backcross pullets have laid at least as well as the high-rate line. Moreover, they have a more satisfactory egg size and body weight, neither of which has varied much from year to year. Production shows no signs of falling off in succeeding generations although, on genetic theory, the third cross, apart from the selected trait (rate), should now be over 90 per cent low-rate line in hereditary constitution. It is enough to look at the mortality figures to see that this has not been realized.

A more detailed study of the records showed that rate of production seemed to be behaving as expected—that is, that the average for the backcross was intermediate between those of the two parent lines—so this could not account completely for the high production. But the distribution of the individual birds was very different in the groups. The backcrosses have been notable for the absence of very poor producers. In this, they resemble first crosses between the same lines, where hybrid vigour results in markedly fewer pauses in the laying cycle. So it seemed that hybrid vigour was being retained, despite the expectation that it would have become less with each succeeding generation.

Commercial Possibilities Now, as has been said, it is not always possible to identify birds carrying high-rate genes, but those with the most heterozygous background—that is, with the most even proportions of supporting genes from the two parent lines—would be likely to express their abilities most fully, and so be chosen as dams for the next

generation. This would mean that the selection method was having a secondary effect, resulting in more than usual of the hereditary make-up of the high-rate line being retained in the flock. In effect, in each generation, additional selection *against* some of the sire's characteristics was being made, albeit unconsciously.

If this is the right explanation, or something like it, can such a method of backcrossing be carried into commercial practice? There may, of course, be something peculiarly complementary in the two inbred lines we used. On the other hand, there are breeders who find it profitable to return year after year to the same outside source for their stock cockerel. Their success, therefore, may sometimes rest on a similar system of rejecting some trait, brought in by the male, in their choice of breeding females. Given the proper ingredients, there seems no obvious reason why the scheme should not be transferable to a wider field.

The essential elements seem to be: first, a pair of lines, strains, or breeds that nick well; and, second, a recognizable trait in the strain to be dropped, which requires a heterozygous background for its fullest expression—in this case, rate of production. It is the first requirement that presents the difficulty, particularly if males are bought in, and not always from the same source. It will be remembered, however, that the high-rate line had small egg size. It may be possible to turn to profit this by no means uncommon failing of high producers. Thus if males are obtained from strains with heavy egg weight, there will be more opportunity for them to be genetically different, and the two extremes of size would counteract one another in the cross progeny.

The system boils down to finding a group of females, even one at a time, with extremely good production and very small egg size, and mating them to a male from a strain with a large egg size. In each successive generation, pullet progeny which are laying well and in long sequences can then be selected and also mated to "large egg" males.

There is no guarantee that this system will work, but it seems well worth a try, since, if it does, it may have various useful applications. It would require no extra outlay on a one-sire flock. It could be incorporated into the breeding systems of a large closed flock, or even carried as a sideline to supply birds of the right characteristics for the smaller breeder. For those with a taste for plumage colour inheritance, it might offer the added challenge of establishing uniform backcross flocks from pairs of differently coloured breeds.

SUMMER LETTUCE VARIETIES

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An article by Mr. F. A. Secrett, last month, described modern methods of growing commercial crops of lettuces. The following account of experience with lettuce varieties in outdoor trials serves to illustrate the wide range of varieties available to the grower for the summer market.

UNTIL recently there was considerable confusion in lettuce varieties, with many different names existing for the same variety. The varieties of summer lettuce were, however, classified and described by L. E. Watts,* who grew over 200 of them at the National Vegetable Research Station between 1952 and 1954. Each variety was described and placed in a group with others, which, although bearing different names, were indistinguishable in appearance. The magnitude of the task can be judged from the fact that no less than thirty-three names were found for one group of apparently identical varieties of the White Boston type!

Although Watts found quite a large number of different types, many of these were confined to American and continental varieties which are seldom used in this country. He discovered, in fact, that sixteen distinct types covered almost all the varieties used by commercial and private garden lettuce-growers in this country; and of this sixteen, only a few could be said to be widely used commercially.

The varieties were finally classified by Watts into three main classes:

A—All the Year Round or Butterhead class
B—White Boston or Trocadero class
C—Webb's Wonderful or Curly Crisp class

Within each class he placed a number of groups of indistinguishable varieties which, although different from other groups, shared the class characteristics. As a result of this work, the grower who wishes to change his variety can now ensure, simply by referring to Watts's report, that he is not in fact planting the same variety under a different name.

The commercial lettuce-grower is, however, more concerned with varietal characters of economic importance than with the botanical features used to describe and classify varieties. And as Watts pointed out, there was no attempt during the classification to assess cropping capacities. Accordingly, since 1954 the N.I.A.B. has been carrying out trials on a number of different soils in which full cropping records are taken in an attempt to assess the commercial attributes of some of the different types Watts described. These trials are not yet completed, and until they are it will not be possible to draw any firm conclusions. There are, however, some general indications of varietal behaviour sufficiently marked to warrant consideration by growers.

The variety White Boston, which is apparently identical with Trocadero Improved, Borough Wonder, and Attraction, to quote only a few alternative names, is probably the most widely grown lettuce in this country, but All the Year Round is also used to a considerable extent. There appears to be little demand for lettuces of the Curly Crisp class, as the English public seem to prefer the softer type of lettuce. In America, however, the Curly Crisp types are probably grown to a far greater extent than any other.

* Synonym in Lettuce Varieties. L. E. WATTS. *Ann. Rep. Nat. Veg. Res. Stn.*, 1954, 16-36.

SUMMER LETTUCE VARIETIES

Turning to individual varieties, it may be of interest to give an account of some of those which have been included in the trials. The group to which each belongs (according to Watts's classification) is given for the benefit of growers who, although they may not recognize the variety under that name, may perhaps find it in more familiar form under another name in Watts's report. The names of a few of the more important of the apparently identical varieties are given in brackets.

All the Year Round In the All the Year Round or Butterhead class (Class A), which is characterized by having predominantly blistered leaves and rather soft lettuces, there are seven groups commonly used in this country. These are:

	Group
All the Year Round (Market Giant, Matchless, Covent Garden) ...	A1
Feltham King (Gloire de Nantes)	A6
Summer Market	A10
Summer Giant	A11
Dryweather	A12
Tom Thumb	A13
Continuity	A30

Of these, Tom Thumb, a dark, very early but very small type, and Continuity, a heavily bronzed lettuce, are rarely used commercially, being private garden varieties. Although the colour of Continuity is not popular, the plant is able to stand up well to hot weather.

All the Year Round, the name variety of the class and also of group A1, is a light to medium green lettuce with a soft but well-packed heart. In size and time of maturity it is almost the same as White Boston.

All the other four groups are later than All the Year Round, except for Summer Market, which matures about the same time. But Summer Market is smaller and rather more susceptible to leaf tip-burn. The disorder known as tip-burn is not a true disease, but is characterized by some or all the upper edges of the leaves dying and becoming dry and brown. There are marked differences between some varieties in their susceptibility to it. Feltham King, which used to be known under the name of Gloire de Nantes, appears to be no more susceptible to tip-burn than All the Year Round, but Summer Giant and Dryweather are both susceptible. All three varieties give rather smaller lettuces than All the Year Round.

White Boston In the White Boston or Trocadero class (Class B), which differs mainly from Class A in having much smoother and less blistered leaves, there are only three groups which are widely used.

	Group
White Boston (Trocadero Improved, Borough Wonder, Northern Queen, Attraction, Market Favourite, Unrivalled)	B1
Cobham Green	B2
Feltham Greenheart (Cheshire Green)	B3

White Boston itself is, as mentioned earlier, probably the most popular commercial lettuce variety, though it may be better known under some of the other names. It is as quick maturing and about the same size as All the Year Round.

Cobham Green is a comparatively new variety which is becoming quite popular. It differs from White Boston in appearance, being appreciably darker green in leaf, and trials so far completed suggest that Cobham Green is not only slightly quicker maturing but may also outyield White Boston, though the advantage is small. Feltham Greenheart differs from White Boston only in appearance, being more delicate and slightly darker green. It seems to be similar in size and rate of maturity.

The Curly Crisp Lettuces The Curly Crisp class (Class C) is markedly different from the other two classes. Its firm, crispy brittle lettuces are generally large, more spherical, and rather slower maturing than either Classes A or B. Varieties within this class are very popular in America, but there appears to be only a limited use for them in this country. Thus although Watts described 21 different groups within this class, only six are generally available in this country. They are:

	Group
Webb's Wonderful (A1, New York)	C1
Hercules	C6
Great Lakes	C8
Summer Salad (Avalanche)	C18
Ohio (Favourite)	C19
Iceberg (Holborn Standard, Supreme)	C21

Of these, Webb's Wonderful, Hercules and Great Lakes are heavier croppers than Summer Salad, Ohio and Iceberg. Webb's Wonderful and Hercules are slightly quicker in maturing than Great Lakes, but both are markedly slower than White Boston. Webb's Wonderful and Hercules differ from each other in that the latter is darker, crisper, more blistered, and the leaf edges have deeper serrations than Webb's Wonderful.

Great Lakes has leaves which are less blistered than Webb's Wonderful with irregular serrations at the edges. Summer Salad is rather smaller than many of the curly, crisp varieties and has more of a Butterhead texture. It is very susceptible to tip-burn, as also is Ohio, which differs from Summer Salad only in having darker lower leaves.

Iceberg is the only curly, crisp type used to any extent which has a pink tinge. It is otherwise similar to Summer Salad, except that it is markedly more resistant to tip-burn.

Meeting the Market Demand From the descriptions of quite a limited number of types it can be seen that the grower has a wide range from which to choose. It must be remembered, however, that the choice of type is dictated much more by the requirements of the particular market than by any other factor. No matter how well grown and presented it may be, it is useless to offer a large, crisp lettuce to a market requiring a smaller, softer type. On the other hand, the grower has a choice of variety within any particular type and would be well rewarded by a careful consideration of the one most suited to his requirements.

Trial results so far obtained suggest that Cobham Green, with its darker colour, is worth a trial as an alternative to White Boston. Similarly, Great Lakes or Hercules are promising for the curly, crisp market. If a pink tinge is no disadvantage, Iceberg could also be included, but it must be remembered that Summer Salad and Ohio are both susceptible to tip-burn.

In the All the Year Round class the trials do not suggest any strong competition for the name variety, though, as Mr. Secrett mentioned, Feltham King is sometimes used as an alternative for specific purposes.

Seed stocks offered by reputable seed merchants are generally very true to type, and growers' regular seed merchants should be able to supply seed of any of the varieties mentioned, either under the name used in this article or under one of the other names listed by Watts. There are undoubtedly fine differences between any two seed merchants' stocks of a variety or a varietal type, but it is extremely rare for a grower to be supplied with seed of a completely different type from that ordered. If he buys from his regular merchant, there should be no reason to doubt that a grower will be supplied with the variety that he wishes to grow.

Winter Milk

RAIN turned to snow during the night, and this morning the skeleton of last summer is half-buried in a white tomb. Now the flakes have stopped falling, but the wind has shifted round from the south-west to the north-east and is growing in strength. The delicate, lacewing tracery of the tall elms sways incessantly, like seaweed in a restless tide.

The dairyman, saturated in sixty years of rural lore, smelt the snow even before he saw it sparkling like golden quartz in the yellow light of his lantern at six o'clock this morning. The creaking and gentle clashing of the elm branches out of sight overhead told him of the change of wind and sent him unerringly to the leeward hedge in his search for the cows. Their shaggy winter coats and strategic heaps of straw keep them reasonably comfortable, but they are eager enough to lumber over to the bail for their morning ration of cake.

Keeping up the milk yield now, though, will be a problem. "Quick come, quick go" is a sound country proverb for every sort of weather but snow. Goodness knows how long this will hang around—maybe for a month or more. As likely as not, there will be more before the thaw.

The milking bail, on its winter slab of concrete, sits reasonably sheltered, but even so the frost has found it and the engine needs a good deal of coaxing before it splutters into life. The patience bred by a lifetime with animals endures a considerable strain this morning, as the dairyman copes first with cows unsettled by the unfamiliar, then with a recalcitrant boiler fire, and all the time with the insidious frost.

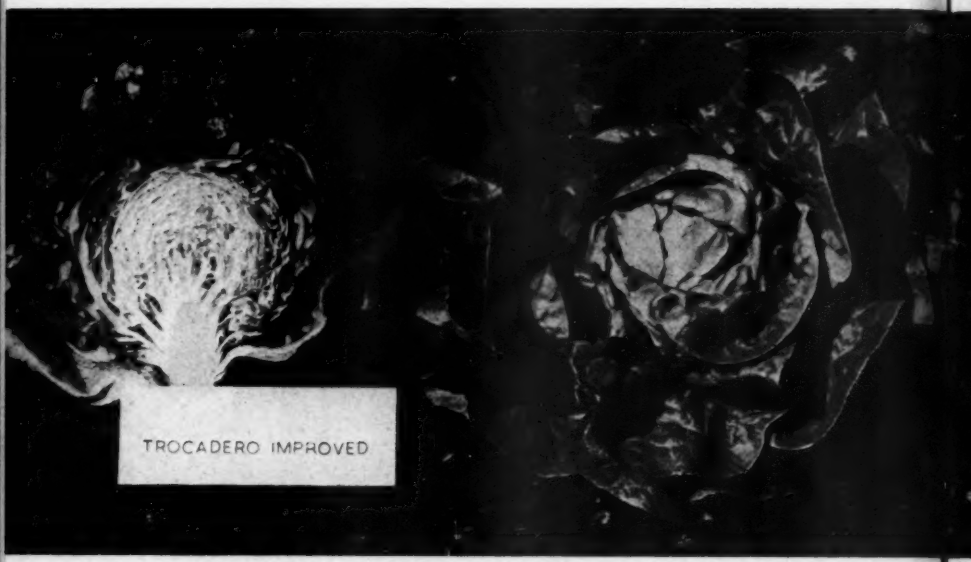
After breakfast will come the difficulties of feeding the cattle in kale fields half-buried in snow and harassed by befouling hordes of pigeons, of carting loads of silage and hay through fields and over tracks where the snow clogs and restrains like wet sand. There is the doubt, too, whether the milk lorry will get through.

Although it has its attractions in June, bail milking is the least comfortable method of extracting milk in winter. In most parts of the country it is not possible, but where the quickly-draining chalk provides dry pastures, it has much to recommend it in economy and animal health. The acclimatized cows avoid the dangers of sudden changes of temperature between the cosy milking parlour and the windswept fields. On the other hand, comfort is worth a bale of hay, for the cows do not then have to eat so much to maintain their body heat.

The pros and cons provide an endless topic for discussion, but ultimately each farmer adopts the method which suits him best—or which he has to. And whatever the method, it has its drawbacks. Say what we will, winter milk production is bound often to be an uncomfortable and unpleasant job. Only a powerful incentive would ever persuade a farmer to undertake it.

On such a February morning the thought of it keeps the farmer's morale a little above depression level, even though he may sometimes think there are easier ways of earning a living. It inspires him to think of pleasanter mornings three months ahead, when the cuckoo will be calling among the small new leaf of the elms, bees will be humming around the sallow down the lane, and a robin will be nesting behind a pennywort in a crevice of that wall. Sometimes, though, imagination finds the going difficult, particularly when he sits down unexpectedly and hard, with a full churn on top of him.

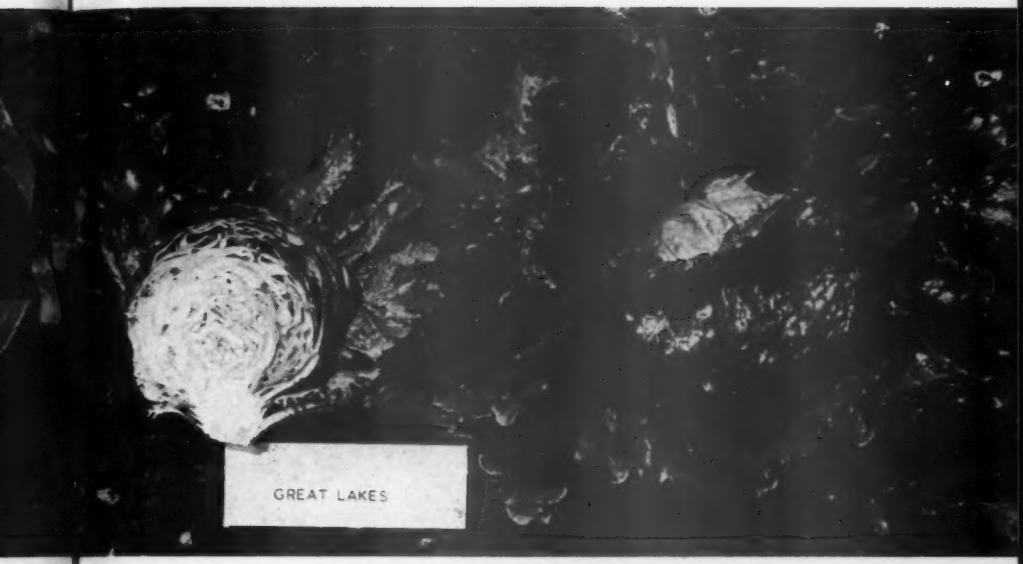
R.W.



Trocadero Improved, apparently identical with White Boston, is probably the most widely grown lettuce in this country.

All the Year Round is a soft lettuce with predominantly blistered leaves.

Varieties article on pp. 527-9)

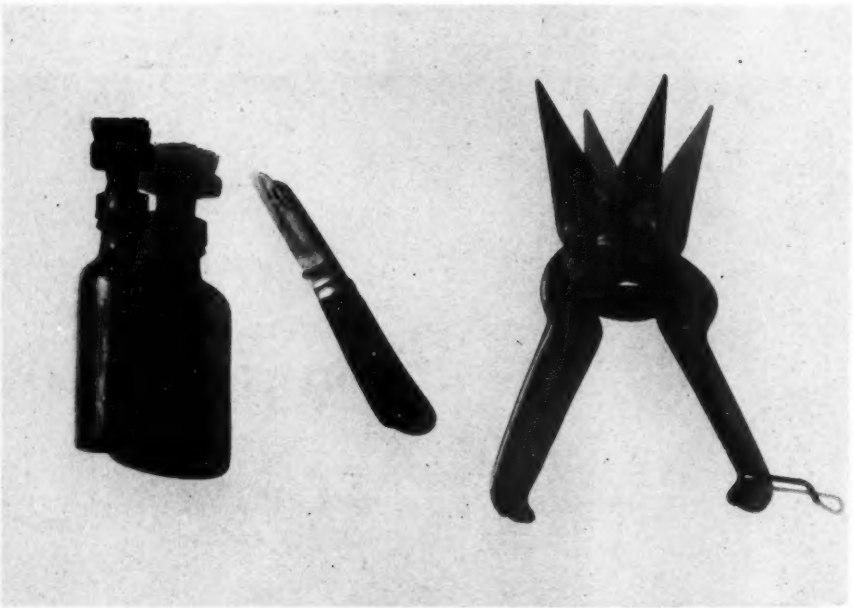


Great Lakes is a heavy cropper of the Curly Crisp type.

A trial is recorded.

Eradicating Foot Rot at Cannington (Article on pp. 531-2)

An Australian-type " cradle " is used where extensive trimming to the feet has to be done.



Photos: *Douglas Allen*

Special bottle with brush top, a paring knife and shears.

ERADICATING FOOT ROT AT CANNINGTON

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Foot rot of sheep can be controlled by regular inspection, trimming and treatment of the feet. But after treatment infected sheep must subsequently be kept apart from the main flock and both groups should be turned out on clean pasture.

FOOT Rot has been a problem among sheep in this country for at least two hundred years. The most obvious sign of the disease is lameness, which is often severe and may affect several sheep in the flock. But it may be present, particularly in dry weather, even when there is little obvious lameness, and will flare up only when the pastures and the land are wet. If both front feet are affected, the animal may progress on its knees and remain recumbent whenever possible. The infection generally starts on the skin between the hoofs and works downwards, separating the horn from the underlying tissues. If unchecked, it spreads across the sole and up the wall of the hoof, and may eventually cause complete separation of the hoof. But the latter condition is unusual; instead, the hoof tends to develop unevenly, with long toes which grow outwards and then upwards.

Research work published by Beveridge* in Australia in 1941 showed that the cause of foot rot is a large, rod-shaped germ with knobbly ends, called *Fusiformus nodosus*. Other germs often invade the tissues of the feet, causing further damage. A sheep with foot rot leaves the germ *F. nodosus* in the mud, on the soil or on the herbage as it grazes, so that the healthy sheep pick up the infection on their feet. The germ penetrates by getting into minute abrasions in the skin between the hoofs or into cracks in the horn itself. It is believed that the germ cannot live in the soil or on the pasture for much more than a week, and this is a most important point when we come to consider the control of the disease. It means that if fields are free of sheep for a fortnight, then healthy sheep cannot contract foot rot when they are turned into this field.

Two Campaigns at Cannington An attempt to eradicate foot rot from the flock of sixty Clun Forest ewes at the Somerset Farm Institute was begun in May 1955. The flock was gathered in a dry yard, the ewes and lambs turned up, and each foot inspected and trimmed. All the animals with normal feet were put through a foot bath containing 5 per cent formaldehyde (1 gallon of commercial formaldehyde in 19 gallons of water). They were then turned out on a field which had not carried sheep for at least two weeks. In the case of animals with lesions of foot rot, all the loose horn was trimmed off. This operation took time but it had to be thorough, and when all the diseased soft tissue was exposed these areas were carefully treated with a 10 per cent tincture of chloramphenicol—

* Foot Rot in Sheep: A Transmissible Disease due to Infection with *Fusiformis nodosus* (n. sp.): Studies on its Cause, Epidemiology and Control. W. I. B. BEVERIDGE. *Bull. Counc. Sci. Industr. Res. Aus.* No. 140, 1-53.
Field Trials on Eradication of Foot Rot. W. I. B. BEVERIDGE and T. S. GREGORY. *ibid*, 54-6.

applied with a small brush attached to the bottle. The healthy feet of the affected ewes were brushed with 10 per cent formaldehyde or dipped in a jam jar containing this solution. The knives used for trimming were dipped in 10 per cent formaldehyde solution while the next sheep was being caught. After treatment, all the infected sheep were allowed to join the main flock. This was a mistake, but even though we knew the risks involved, we did not think it a practical possibility at the time to keep the affected animals apart and so maintain what was virtually two flocks.

The sheep were subsequently examined fortnightly, and individual cases of lameness treated as soon as they were detected. Eighty per cent of the cases treated with chloramphenicol recovered without further treatment, but odd cases of foot rot still cropped up during the ensuing months. The task of examining the feet of all the ewes and the lambs was laborious, more especially after heavy rain when the sheep had a lot of mud on their feet. But this routine is absolutely essential to success, for the disease can be spread very quickly. Indeed, later on we had a practical example of how rapidly foot rot can be passed on, when seven or eight apparently healthy ewes all became victims of foot rot within a very short time of being put in a poultry pen.

In August 1955 a further effort was made to eradicate foot rot from the flock. There were advantages in concentrating on it at this time—numbers were at their lowest, since the lambs had gone; and the weather was dry, so there were no muddy feet to cope with. An Australian-type "cradle" was used to hold the sheep, and this proved most useful where extensive trimming of the feet had to be done. But it was rarely worth lifting a ewe on to it for routine inspection alone.

The results of this second campaign were most encouraging. There were no more cases of lameness from October 1955 onwards, and the new crop of lambs were born, fattened and sold, without trouble.

Isolation Imperative The real test came when there was such a shortage of grass in July 1956 that the poultry pens had to be used for grazing. After six weeks of close folding in these pens (during very wet weather towards the end of the period), there was still no sign of foot rot. This shortage of grass had, however, forced on us a small risk, because other sheep were grazing one section of the pens and, although the two flocks never trod the same ground, there was the possibility that infected mud might be carried from one section to another on the boots of the poultry staff. The flock was moved back to the farms in September and, two weeks later, three ewes became lame with foot rot. It is just possible that the infection was acquired while the sheep were grazing the poultry pens.

When another attempt to eradicate foot rot is made, we shall ensure that the infected and doubtful cases are kept apart from the main (healthy) flock and run as a separate flock until they are cured. This will entail frequent examinations of the feet, and the animals will not be allowed to rejoin the main flock until some three weeks after the last case has been detected. However, we are convinced that thorough trimming of the feet, treatment of cases of foot rot with chloramphenicol, standing the healthy sheep for ten minutes in a foot rot bath containing 5 per cent formaldehyde four inches deep, and turning each bunch of sheep (infected and healthy) after each gathering into pastures which have not been used by sheep for at least fourteen days, will lead to the speedy eradication of foot rot from the farm.

STOCKBRIDGE HOUSE

F. G. SMITH, N.D.H.
Director

STOCKBRIDGE HOUSE was established in April 1950 for experiments in growing vegetables, soft fruit and rhubarb, and with a special interest in intensive cultivation under Dutch lights and structures and in mobile glasshouses. The station is situated on the plain of York within a triangle formed by York, Tadcaster and Selby, and lies about 25 feet above sea level. It comprises about 155 acres of flat land, with another 8 acres of water meadows lying away from the farm on the banks of the river Wharf.

The soil on the farm, typical of much of the area, has a low clay content, and at the outset had little organic matter and was of poor fertility. This was not considered to be disadvantageous, as it was felt that favourable results from experiments would carry more weight when obtained on a soil of no particular initial merit or fertility. A satisfactory level of fertility for horticultural crops has, in fact, been obtained only by the application of heavy dressings of organics in the form of farmyard manure, spent mushroom compost, and dressings of moss peat for glasshouse crops. To assist in holding fertility at a high level, a system of ley farming is being practised. The soil is a post-glacial sand 3-5 feet deep overlying an impervious lacustrine clay. Seven distinct soil types have been recognized by the National Soil Survey; and all except one are poor draining. The level nature of the land and the nearness of the clay subsoil to the surface make it difficult to get any appreciable fall on the drains, and the water-table is frequently high during the winter months.

The demands of the experimental programme militate against any very rigid crop rotation, but as far as possible brassicas are brought into rotation with spring wheat and oats, which are followed by a three-year ley. The established ley is cut three times during the year—at the end of May for silage, in July for a hay crop and in late September for a second silage crop. This forage is sufficient to fatten 50-60 bullocks yarded between October and May. Bedding is generous and, with extra straw brought in for the purpose, 500-600 tons of farmyard manure are made annually.

Some corn crops are undersown with short-term ryegrass leys, which are dressed with nitrogen after the harvest to provide a heavy green crop to plough in either in the late autumn before planting rhubarb or in the following spring before broccoli.

Outdoor vegetables and intensive cropping are the main lines, but there is a special interest in forced rhubarb because of the proximity of the West Riding rhubarb industry. Experiments with fruit are mainly varietal trials in conjunction with the National Fruit Trials, and flower crops are chiefly represented by chrysanthemums.

Outdoor Vegetables In conjunction with the National Institute of Agricultural Botany, variety trials have been conducted over the past six years with winter cabbage, Brussels sprouts, early summer and autumn cauliflower and with hardy winter cauliflower (broccoli). The earlier trials of sprouts showed Evesham Special and Best of All to be suited to the locality. At the present time a number of Irish varieties raised by

Professor G. O. Sherrard of Dublin University are under trial and have attracted a lot of attention from growers because of their high quality.

Among hardy winter cauliflower varieties, only Cambridge Hardy Late has approached the hardiness of the local West Riding strains, which the station is now attempting to improve with the object of making them more uniform. Investigations into the spread of the Cauliflower Mosaic virus have shown the importance of preventing infection of young plants, either by isolating the seedbed or protecting it by suitable barrier crops. The practice at Stockbridge is to combine both precautions by sowing a barrier crop of rye or barley and keeping the seedbed as far away from established crops of broccoli as possible.

A number of long-term experiments of national interest are also being conducted here and at other stations. These cover a sequence of vegetable crops grown in rotation under a range of various cultural or manurial treatments. The long-term experiment on basic cultivation methods is already proving of interest. A steady increase in weeds has been observed where rotary tillage is the sole means of cultivation. On the light soils of the station this form of tillage favours the establishment of crops raised from seed, but has a depressing effect on the growth of spring cabbage when practised as an autumn cultivation in preparation for the crop.

Forced Rhubarb Early experiments with the forced rhubarb crop were concerned with spacing and manuring in the field. In spite of the low status of phosphate and potash in the soil, the only large response has been to nitrogen applied in the field, although a significant response to lime has indicated that rhubarb is not as tolerant of high acidity as is sometimes assumed. The recent completion of a range of experimental rhubarb sheds will permit investigation to be made into temperature and atmospheric conditions during forcing. The influence of pre-forcing temperature is already known to be important, and a more detailed study of its influence is now being conducted.

Protected Cropping Stockbridge is particularly concerned with experiments in unheated Dutch light frames and structures, and in mobile glasshouses and plastic structures. In these respects its work is largely complementary to that of the Fairfield Experimental Horticulture Station in Lancashire, which deals primarily with the problems of permanent glasshouses.

The only permanent glasshouses at Stockbridge are two east-west propagating houses, which were designed in consultation with the John Innes Horticultural Institution and have since been duplicated at two other stations having different climatic conditions. They were built to enable an uneven span design with a high eaves level on the south side to be compared with an even span design of conventional cross-section. A unique feature of these houses is the gusseted roof-bar construction which enables gutter bars and heavy ridge bars to be dispensed with, thereby reducing the obstruction to light and cheapening the cost of construction. Comparisons made so far between the two houses have shown that the high eaves level in the uneven span design is beneficial only under conditions of direct sunlight—all too infrequent at Stockbridge, because of the industrial haze of the West Riding.

The experiments on lettuce cropping in unheated structures have shown that heavy crops can be grown and cleared before the end of April by using the variety May Princess, which matures earlier than other cold glasshouse lettuce, by planting before Christmas rather than afterwards and by closer

spacing (7 × 7 inches rather than 8 × 8 inches). This permits the earlier planting of tomatoes, and thus earlier and heavier crops with a larger proportion of the fruit maturing during the high price period.

Uniformity trials carried out on the tomato crop in half-acre blocks of unheated Dutch light structures have shown that the outside bays of the house yield about 18 per cent more fruit than the inner bays. Most of this increase is attributable to the outermost row of plants around the perimeter of the house, which yields over 30 per cent more fruit than any other row. If this finding is confirmed by similar results at other centres, it should have an important influence on the future shape of unheated glasshouses, particularly Dutch light structures.

The erection of a prototype mobile glasshouse covering ½ acre was completed in 1953. It was designed by the National Institute of Agricultural Engineering and has been the means of gaining much valuable information on the design and use of mobiles.* Growers and manufacturers of glasshouses from all over the country have been to inspect it. This house is now being used to study cropping sequences suited to heated mobiles, while three single-bay mobile structures, which were erected early in 1955, make it possible to compare cropping sequences for unheated mobiles.

Windbreaks The station is exposed to the full force of the fierce winds which sweep the plain of York at all times of the year. The effect of wind damage to crops is too often underestimated. One of the first developments to be undertaken in the autumn of 1950 and 1951 was the planting of windbreaks along the south-western and western boundaries of the farm across the direction of the prevailing winds.

The aim has been to provide a central core of hardwood trees flanked on each side with evergreen conifers. Corsican pine and Sitka spruce have been chosen because of their tolerance of atmospheric pollution. The hardwoods have been varied to avoid monotony. The first planted of these windbreaks is now over 18 feet high. Effective protection at ground level from such shelter is not more than ten times the height, so that even as mature trees the benefit will not be felt at more than 200 yards from the break. The initial protection of the tree belts is therefore being built up in depth by the planting of hedges to give protection to those parts of the station where more intensive cropping is carried out. In experiments concerned with shelter, solid walls of straw bales have been compared with open screens of ½-inch mesh wire netting and with 1-inch builders' laths spaced at 1 inch apart. The lath screen has generally proved the most satisfactory.

The search for a cheap form of cover for early-flowering chrysanthemums led to the building this year of two light wooden structures glazed with plastic film. The results so far achieved with these structures have been encouraging, and it is now intended to cover crops of cold-house lettuce and to test the durability of the structure under winter conditions.

Fruit Except in private gardens, fruit is not widely grown in Yorkshire, and little information was available on the suitability of the site and soil for fruit growing. The initial projects have therefore been on a very limited scale and are confined at present to variety trials under the National Fruit Trials of the soft fruits—red and black currants, gooseberries, raspberries and strawberries—and to extended variety trials of apples and plums. Six varieties of damsons have been planted along the western boundary at the

* An article by Mr. Smith, on mobile glasshouses appeared in the February 1956 issue, pp. 522-5.

northern end of the farm, where their cropping as shelter trees can be compared.

To obtain early information on apple varieties suited to the district, the variety trials are being grown as free spindlebush trees on Malling No. VII rootstock and as delayed open-centre bushes on Malling No. II. The free spindlebush is a continental method of training in which all the lateral growths on the young tree are tied down in a horizontal position to encourage the early formation of fruit buds. Promising crops have already been taken from some varieties in this trial.

Improved Techniques The station is able not only to take advantage of the results of its own work to improve its cultural standard, but also of experimental results obtained elsewhere. When possible improvements in practice have been established by experiment, the station tries to incorporate them in its standard cultural practice (subject to other experimental demands) so as to help establish their commercial value or practicability. For example, the best method of applying insecticide for the control of Cabbage Root fly is apparently in a liquid form around the base of the plant immediately after planting, and the use of a trigger-tap on a spray lance has therefore been adopted as standard practice on the station for the treatment of all brassica trials likely to be attacked by the pest. In the early days of the station, Whiptail in cauliflower was a serious trouble, and experiments were laid down to study its prevention. As a result, it has been possible to adopt a standard practice of dressing the soil before a cauliflower crop with 4 lb sodium molybdate per acre, and this has proved most effective.

FORESTRY COURSES

The Forestry Commission has arranged a number of courses to take place in England and Scotland during 1957. The dates of the courses and where they will be held are given below.

Woodmen (courses designed to fit men for supervisory posts)	
Chatsworth Estate, Derbyshire	March 6-April 17 April 24-June 5
Atholl Estate, Perthshire	April 3-May 15
Landowners, agents and factors (courses on woodland management)	
The Commission's Residence in the New Forest	Feb. 25-March 1 May 20-24
Forester Training School, Faskally House, near Pitlochry, Perthshire	April 8-12
Officers of county planning authorities	
The New Forest	May 6-10
Those concerned with the management of local authority woods	
The New Forest	May 13-17
School teachers	
The New Forest	August 14-23

Applications to take part in the courses should be made to the Chief Education Officer of the Forestry Commission, 1 Princes Gate, London, S.W.7, or, in the case of courses in Scotland, to the Director of Forestry for Scotland, 25 Drumsheugh Gardens, Edinburgh.

THE RIGHT SEED

N.I.A.B. CROP CONFERENCE, CAMBRIDGE

L. W. TOLLADAY

Ministry of Agriculture, Fisheries and Food

Unfortunately it is impossible in the space available to refer to all the papers given at the recent Cambridge conference, but the following report will, it is hoped, serve to indicate something of the wide field over which the discussion ranged.

OF all the demands on a farmer's purse—and they are many and varied—there is no sounder outlay than buying the best and most suitable seed; for even the most highly organized farming edifice will quickly tumble to poverty if it is denied the right seed for the job. A great deal is, however, being done to ensure that British agriculturists and horticulturists are able to take the fullest advantage of the work of the plant breeders, and there can be little doubt that the 300 or so farmers, market gardeners, seedsmen and scientists who attended the N.I.A.B. Crop Conference in December, came away from it well pleased with the progress being made.

A good example of this progress is the fact that during the year ended July 31, 1956, no less than 71,000 samples of seed were submitted to the Official Seed Testing Station at Cambridge for purity, germination, moisture and disease tests. In addition, rather more samples arrived at the 106 private testing stations licensed by the Ministry of Agriculture. These figures formed a useful background to the opening paper by DR. P. S. WELLINGTON (Chief Officer, O.S.T.S.). But with last season's experience still fresh in mind, it was not surprising that the greatest interest was evinced in his remarks on the influence moisture content and drying have on germination. During the winter months, Dr. Wellington explained, moisture is normally taken up from the atmosphere, and there is a critical level for most seeds (16 per cent for cereals), above which loss in germination occurs. The safe maximum drying temperature without damaging germination depends on initial moisture content. "With really damp grain, intermittent periods of drying and sweating are best," he said. "In 1956 damage was caused not so much by using too high a temperature, but by drying for too long." Applying seed dressings to damp grain may also affect germination, since above a certain moisture content (18 per cent) grain absorbs mercury much more readily. Overdressing also increases the risk of damage.

The need for ensuring that the buyer gets the variety for which he asks was the theme of DR. G. P. CARSON (N.I.A.B.). "Some years ago," he said, "it was common for one variety to have a multitude of names." And even though today we can congratulate ourselves that synonyms have virtually ceased to exist in potatoes and cereals, lack of trueness to name has still been obvious during post-war years in such crops as red clover, some varieties of Brussels sprouts and dwarf French beans. But, he continued, it is not easy to define the word "variety", for it is an agricultural unit created by man to do a particular job. To be genuine a variety must, Dr. Carson suggested, have an individual character which is reproduceable, and, secondly, "it must be identifiable by being demonstrably different".

Vegetables One of the major problems of the vegetable grower is undoubtedly how best to build up and maintain the high level of fertility which he needs. DR. J. PHILP, Director of the National Vegetable Research Station, had something to say on this when he opened the afternoon session on vegetable crops. Much of the work of the Station is long-term, but the results so far do at least give some pointers. Thus it seems that shallow cultivation with a rotary cultivator produces a weed problem and perhaps a hard pan. This treatment appears to be suitable for onions but not for leeks, Brussels sprouts or spring cabbage. Farmyard manure has been shown to confer marked benefits on spring and summer cabbage, leeks, carrots and early potatoes, and to hold its own with such other bulky organics as compost, straw ploughed in with inorganic nitrogen, and sewage sludge.

Some work is also being done at Wellesbourne on controlling weeds in vegetables, but here the difficulty is to find sufficiently selective chemicals. However, some experiments on weed competition are throwing light on the economics of weed control. Thus with frame-grown carrots, one weeding 25 days after emergence gave almost as good a result as a weed-free crop.

Dr. Philp concluded with a handsome compliment to the seed trade for their work in improving varieties. Unfortunately, varieties raised from seed of cross-fertilizing vegetable crops always tend to deteriorate in later generations, no matter how careful the attention given. Nothing can be done until the cause of deterioration is fully understood, and then the modified seed production techniques needed will almost certainly increase the cost of the seed. "But," he emphasized, "poor quality seed is never cheap."

This thought was taken up by MR. C. G. FINCH (Horticultural Trials Officer, N.I.A.B.). "Seed cost," he pointed out, "is usually an extremely small part of the total crop production cost, and economy is no excuse for buying other than the very best seed. Even in times of glut, the right variety, well grown, graded and presented will almost certainly fetch an economic return."

Brussels sprouts occupy the largest acreage (43,000 acres) of any single vegetable in Great Britain, and therefore it was fitting that Mr. Finch should have given a good deal of his time to discussing that crop. Trials have shown that although the earlier maturing varieties generally have the greatest yield, they do not necessarily give the highest cash return.

Locally selected strains are commonly used in some areas, and one of these from Bedfordshire (Mr. Ashwell's) was included in recent N.I.A.B. trials. It proved to be the darkest coloured of all the varieties tested and comparatively free from "blowers". The yield was low to start with but improved after Christmas, and the sprouts were widely spaced and held well. Of all the commercial varieties, only Evesham Special approached the Bedfordshire type for late yield, but the Evesham Special gave a considerably greater crop over the whole season. Cambridge No. 1 was one of the best quality varieties tested, with sprouts less pale than many growers allege.

Mr. Finch concluded with a plea that will be echoed by most vegetable growers. "It is to be hoped," he said, "that in future when a new name appears it will mean a variety distinct from, and in some way an improvement on, existing varieties."

Cereals The farmer who worships at the shrine of high wheat yields and does not worry very much about quality, received short shrift from MR. E. G. THOMPSON (N.I.A.B.). "I want both," he said, "and see no reason why the heaviest yielders should not also be good quality wheats."

And although the present N.I.A.B. Recommended List of wheats is divided as between those grown principally for yield and varieties recommended mainly for grain quality, there were some welcome signs in Mr. Thompson's report of the N.I.A.B. wheat trials that quality and yield are getting closer together.

It is perhaps fitting that at least some of the challenge to Atle, for so long the premier spring wheat, is coming from two relatives—Atson and Svenno. Both are earlier-maturing and give higher yields than Atle. Two interesting varieties in trials were Peko, a German variety which, like Svenno, is now on the provisional N.I.A.B. list, and Koga II. The former is quite different from our usual spring wheats. High yielding, late-maturing, with long straw, the large red grain has soft milling character and biscuit-making quality. Koga II, in two wet years, gave heavier yields than Atle, Svenno and Atson, but in 1955 suffered severely from black rust in the South-West. It does well in soils deficient in manganese and, in these circumstances, may replace Progress.

Figures given by MR. J. A. MCMILLAN (N.A.A.S.) on the farmers' choice of cereal varieties during the past five years evoked a good deal of interest. Using as a basis the number of samples reaching the Official Seed Testing Station, he showed that whereas in 1951 Atle accounted for 20 per cent of the total, and rose to over 44 per cent in 1955, it was down to 14 per cent in 1956. In contrast, Cappelle Desprez has risen steadily over the past four years to 17 per cent. With oats, Victory has given way to S.147, S.172, Sun II and, the newcomer, Blenda. In barley, the advance of Proctor (to 42 per cent within four years) and the decline of Kenia, Plumage Archer and Spratt Archer are outstanding.

Also of interest in this context is a survey made by the N.A.A.S. in Cambridgeshire, which showed that over 75 per cent of the county's cereal acreage in 1955 was sown with varieties on the N.I.A.B. Recommended List—a gratifying result. For, as Mr. McMillan pointed out, " Without the Institute the farmers' choice would be difficult. There would be little reliable information on the merits of the many hundreds of varieties available."

It was very obvious that whatever the other points of discussion arising from the Conference (most notably at this stage a desire to have the Recommended List elaborated to indicate varieties suitable for particular areas and purposes), this was one statement that had the wholehearted support of all present.

GREEN CROP DRIERS' CONVENTION

TOM BILLINGTON

ANY illusions that the members of the Green Crop Driers' Association might be resting on their laurels must have been quickly dispelled at the Seventh Annual Convention of the Association at North Berwick on November 19-21. Grass drying in the past, present and future; the growth and development of the industry in Britain and in many countries overseas; methods of improving production and lowering costs; and the possibility that the future demand for the product is likely to exceed supply—all came under critical and searching review.

In his inaugural address MR. R. O. DAVIES, President of the Association, spoke of the progress of grass drying in overseas countries and laid stress upon the way in which in America the artificially cured product of alfalfa (lucerne) had, to a great extent, taken the place of the naturally cured (sun-dried) material. In 1955-56, he said, the total output of dehydrated alfalfa in the U.S.A. was 1,173,000 tons, whereas ten years ago it was only 451,000 tons. During the same period, the production of sun-cured alfalfa meal has declined from 573,000 tons to 190,000 tons. There has also been a large increase in the U.S.A. in the pelleting of the dried products which, together with granular meal, can be bought either with or without added fat or oil. Normally the amount of added fat or oil would be about 1 per cent, but some food manufacturers have been asking for up to 5 per cent.

By far the largest amount of the dried alfalfa goes into foods for poultry, yet such is the increasing demand for pellets from cattle- and pig-farmers that it is probable that sales in this way will soon exceed those to poultry-farmers.

An Even Flow The Convention was opened by PROFESSOR S. J. WATSON (Edinburgh and East of Scotland College of Agriculture), who, after reviewing the development of the industry in this country over the past thirty years, pointed out that the main problem now facing the industry is the purely agronomic one of producing an even flow of a suitable material to the drier. This led SIR ALEXANDER KINLOCH, one of Scotland's leading grass driers, to relate his experiences in trying to ensure an even flow. He had found that manuring a field little and often helped considerably. But it is not an easy problem to solve; sometimes when they were working on one field they found that another field would be ready for cutting before they could get to it. The crop needed retarding to keep it in the young and succulent stage: that can be done with a dressing of 2 cwt "Nitro-Chalk" to the acre. He had found that such a dressing definitely delayed the development of the crop.

That dried grass was a balanced ration only when it consisted of a mixture of the production of different seasons of the year was the opinion of MR. P. P. WALLEY of Waverton, Chester. He said that grass dried in the spring in the young and succulent stage is very laxative and rich, whereas autumn-dried grass is not so laxative and does not possess quite the same milk-producing quality. Therefore he advocated mixing 20 per cent of spring-dried grass with that dried in the autumn, maintaining that this has a beneficial effect upon milk production. Support for the idea came from Professor Watson, who agreed that there is a great difference in the composition of grass in the spring and in the autumn.

Grass-cutting Machinery The conventional type of grass mower came in for criticism from MR. C. CULPIN (N.A.A.S.) when he answered questions in the discussion following his paper "Developments in Field Equipment". He said that the National Institute of Agricultural Engineering has carried out experiments to compare the drying rates produced by a roller-crusher imported from the U.S.A., a British-made bruiser, and a conventional rake-bar type of combined haymaking machine used as a tedder.

These machines were used mostly in fine weather and, under these conditions, it was found that the bruising and rolling treatments reduced moisture content from about 77 per cent to about 57 per cent in 8 hours, while tedding with the combined haymaking machine brought it down to about 62 per cent in the same time. Other experiments have shown more positive results in favour of bruising. In practice, however, because of the difficulty of securing smooth operation of crushers and bruisers, effective tedding is of more interest.

This led to a discussion as to whether grass should be wilted in the field before collection for the drier, and, if so, the best methods of getting quick results in the wilting. Mr. Culpin said that the mower, as we know it, is about the most unsuitable way of starting to make hay that could possibly be thought of. We have become used to the idea that a beautifully laid swath offers the best start; but, in fact, nothing could be worse. What is wanted is something to fluff up the swath immediately, and it is worth coupling up a machine that can do it behind the mower and letting the tractor draw the two machines.

Sir Alexander Kinloch led a strong opposition to the school which believes in wilting. He has found that freshly cut grass goes through the drier quicker than wilted material. But Mr. Culpin was by no means alone in his advocacy of wilting.

It was at this point that a novel suggestion came from LT. COL. H. W. SALMON of Langham, Colchester, who asked if anyone present had tried cutting grass with a combine harvester. This autumn he had had some corn which contained a great deal of grass—in fact, sometimes there was more grass than corn! He had put the combine through it and it came out in a beautiful condition. They made excellent hay of it. As an experiment, he also started cutting lucerne with a combine, and it gave him a most desirable fluffy swath.

In reply to a question, Col. Salmon said he had cut grass only 6-8 inches long with a combine. Flat pieces of tin had been put on the pick-up reel to sweep the grass back, and an extended table was used to give a longer sweep from the knife to the intake. With these modifications, the combine can deal with grass 6 inches long. This method was apparently new to Mr. Culpin, who pointed out that it was more usual to use only the cutter-bar. In any case, the concave would have to be set as wide as possible.

Efficiency in Drying Machinery Methods of achieving significant cuts in costs of production were outlined by MR. G. W. GRAHAM, Director of Templewood Engineering Company, in his paper "Greater Efficiency in the Process of Grass Drying". After explaining the simple but comprehensive system of accountancy and recording of all essential statistics of the technique of drying practised on his Silverstone (Northants) farm, he spoke of mechanical improvements to the driers which, he claimed, had already led to striking economies.

They had fitted a pre-loader conveyor and spinner at the feed end of the

drier and a turnover spinner at the fan end. The former resulted in the saving of one man in the operation of the plant—an economy worth some £275 in the season of 23 weeks. Another advantage was that the spinner pre-loader teased out the grass so that it did not enter the drier in one big mass but was nicely distributed. During the 1956 season the drier worked for 1,200 hours on the Silverstone farms and averaged 9.6 cwt of dried grass per hour. Considering that the machine was rated to produce 8 cwt of dry material from grass with a moisture content of 80 per cent and that, in this very wet season, it produced 20 per cent over its rated capacity, the value of the modifications is clear.

The turnover spinner was estimated to give at least 10 per cent increase in throughput. During the season it had been tried under all conditions and had worked satisfactorily. Applying this 10 per cent increase to 700 tons at a cost of £10 per ton at the plant, it represents a saving of £700 for the season. Fuel consumption was also cut down: this year, still bearing in mind the very wet season, the average fuel consumption was 68 gallons per dry ton of material, as against the average of 74 gallons over the previous two years.

These improvements and modifications had resulted in a total saving of as much as £1,150, or 34*s.* per ton, on an output of 700 tons. It was achieved for an outlay of £1,000.

For next season's work, Mr. Graham intends to introduce a larger trailer for conveying the grass to the drier, and he anticipates that this will reduce costs by a further £262, or 7*s.* 6*d.* per ton, on an output of 700 tons. The capital outlay on the trailer will be about £300.

More Lucerne Needed Some of the old ideas about lucerne were challenged by MR. J. O. GREEN, Head of the Herbage Agronomy Department of the Grassland Research Institute, in his paper "Lucerne in Britain". Britain can boast, he said, of little more than 100,000 acres, which is only a "flea-bite". At least 250,000 acres could and should be grown. The trouble is that many people have the idea that the crop is very particular about the condition of its soil and the local climate. Moreover, much has been written about it, and the subject has been so hedged about by all sorts of "do's and don'ts" that people have become scared of growing it. This is a pity, continued Mr. Green, for lucerne can produce more herbage in dry weather than any other perennial crop cultivated in this country. It will do for upwards of three years what red clover will do for one or two. There is great value, too, in its residual effects.

Lucerne can be grown under a great many conditions of soil and climate. Far from being restricted to certain conditions, it has a tremendous range of adaptation, probably greater than any other cultivated crop. One of the most successful lucerne growers Mr. Green knows, is a man in south Derbyshire. His land is at an altitude of 800 feet and the rainfall is getting on for 35 inches. This is not typical lucerne country by any means, but nevertheless he grows it most successfully.

Summing up the three-day Convention, MR. R. W. MCPHAIL, Vice-President of the Scottish Chambers of Commerce, said that high-quality dried grass possesses properties essential for healthy animal breeding and feeding which no other ingredient, synthetic or otherwise, can supply. Speaking as a manufacturer of animal foodstuffs, Mr. McPhail said that the demand for dried grass has increased prodigiously. He urged farmers and driers to be ready to meet that demand in view of the necessity of producing more livestock at home.

FARMING AFFAIRS

Farming in Iceland Iceland is the oldest continuously settled land in the Western Hemisphere, but the youngest country. Irish monks were there as early as 750 A.D. and remained until the Norsemen came about 870 A.D. Trees do not grow in Iceland nor are there any mineral deposits. The wealth of the country depends on fishing and agriculture. The former industry provides the exports, the latter produces enough meat and livestock products to feed the population of 170,000 people. Water power is abundant, and light industry is making progress.

According to J. B. CAMPBELL of the Swift Current Experimental Farm, Canadian Department of Agriculture, grass is the most important crop. In fact it can be considered the *only* field crop, because cereals seldom mature. The principal grasses are creeping red fescue, deschampsia, northern blue grasses, and species of bent grass. Sedges are common, as are heaths and mosses.

If the entire country was arable it would have tremendous agricultural resources. However, less than 15 per cent of its 40,000 square miles area can be developed, while only another 15 per cent produces vegetation of any kind. The balance is a cold desert, covered with immense glaciers, stark barren mountains, black shifting sand and extinct and active volcanoes. Of the approximately 6,000 square miles of arable land, less than 400 square miles (or 250,000 acres) are currently improved to produce cultivated grasses.

Fertilization is essential in Iceland to produce high-yielding grass crops. Despite the 50 per cent or more organic matter content of the soil, nitrogen fertilizers are required because soil temperatures seldom reach a level to promote rapid nitrification. Oddly, organic matter content increases even when under heavy cropping. Legumes are of little value. Soil temperatures are too low to stimulate nitrifying organisms into feverish activity. Phosphorus is required on all soils, while potash and minor elements are valuable in certain areas. Sulphur and iron are abundant. Applications of up to 400 lb ammonium nitrate per acre are economical.

Haymaking is the big agricultural chore. Modern machinery is used on the level stretches, but the primitive scythe and rake are common wherever tractors and mowers cannot operate. Strings of pack-ponies carry the hay to the farmyard under these conditions. Three crops are not uncommon during the short growing season. The first may be put up as hay, the second ensiled, and the third grazed. Hay-drying equipment is not common, but its use is spreading. Many farms boast silos, and all have substantial hay sheds.

The 600,000 or so sheep are wintered indoors and turned out on range after lambing. There they remain until the autumn round-up, when the lambs are cut out and slaughtered and their carcasses frozen. The practice of free ranging makes range management very difficult, because the land belongs to the district, not to individuals. No charges are collected for improvement.

Erosion is common in Iceland. Extensive tracts of sand have been eroded down to under-lying lava, a matter of perhaps 30 or more feet. It must be realized that this was originally grassland, not soil disturbed by cultivation.

There is an active conservation programme which is bringing devastated tracts of land under control. Nearly 200,000 acres have been under conservation management. Likewise, new grasses and new strains of old grasses are being introduced by the University Research Institute, not only to reseed eroded areas but to increase the yield from grassland farms. The four experimental farms are studying grass production and management methods, and an Extension Service is demonstrating the value of good husbandry and proper fertilization. Progressive farmers are using all available information to improve their farms and give leadership to their districts. However, there is still a hard core of freedom-loving Norsemen who follow the husbandry practices imported from Europe a thousand years ago.

Farm and Forest: 23. Sales Points to Note

Selling timber can sometimes be a complicated business, especially where large trees are involved. The difficulty of moving a bulky and heavy commodity like timber and the relatively large sums that may be involved in its sale underline the need for care. Before leaving the subject of the utilization of farm timber it may therefore be worth giving some hints on the points which need special attention when negotiating timber sales.

If any considerable quantity is involved it is almost essential to obtain expert advice, and the sooner the better. Among other things, the expert will advise on whether to sell by private treaty, tender or (occasionally) by auction. If the sale is to be by private treaty the owner will be well advised to obtain a valuation before he opens negotiations. Prices of standing timber vary considerably from place to place and only a man with a sound knowledge of local markets can give a worthwhile estimate.

It is important to draw up an agreement for the sale. Felling and removal may necessarily be spread over a long time, and this can cause some inconvenience to the vendor. It may also mean that he must wait to reap the full financial benefit from the transaction, for it is common practice for the timber to be paid for as it is removed. Furthermore, the vendor may want to replant the ground, and, if so, he will wish it left as clean as possible. It is possible to safeguard against undue delays and matters such as clearance in the agreement. It is also important, especially where the timber adjoins growing crops, to specify a date before which felling shall *not* begin. If the branchwood, or cordwood as it is called, is included in the sale, this fact should be specified and arrangements for removal made in the agreement: otherwise the vendor may have to dispose of the branchwood separately.

The hauling of timber and the movement of the heavy vehicles used in transporting it occasionally give rise to disputes about rights of way and damage to private roads. In addition, the laws governing the loading of vehicles on the highway and entries from private property on to the highway need watching. Another matter which could give trouble is that of restoring fences or other boundaries. Where necessary, exits, entrances and haulage routes should be specified in the agreement. It is always sound practice to have a word with the local officer of the highway authority.

It should not be thought from all this that selling timber is *unduly* beset with pitfalls, for a little wise planning will enable the vendor to avoid serious difficulties. In any case, the timber merchant is just as anxious to avoid trouble and will gladly co-operate in drawing up a sensible agreement. The object of this note is merely to draw attention to the fact that serious complications could arise if care is not exercised by both parties to the sale.

C. D. Begley,
District Officer, Forestry Commission

At the Farmers' Club:
THE FUTURE OF MILK QUALITY

Coming at a time when a wider market for liquid milk is being sought, the paper by Professor H. D. Kay, Director of the National Institute for Research in Dairying, on January 2 was certainly not lacking in topicality. Added point was given by the Milk Marketing Board's announcement that followed his talk, of a system of price penalty on dairy farmers who consistently produced milk of poor quality.

Keeping quality, hygienic quality and compositional (or nutritional) quality were the three legs of the tripod on which milk production was supported in this country, Professor Kay said. Each leg is equally important; unless all are strong, the whole structure might become rickety. The first two have improved in recent years, but we are not fortunate with the third—compositional quality.

During the last twenty years or so, Professor Kay continued, there has been a fall in average compositional quality, mainly in solids-not-fat, which contain a large proportion of the nutritional value of milk; the fat is, under present nutritional conditions in Britain, less important. In England and Wales, fat content has decreased from 3.74 per cent to 3.52 per cent, and non-fatty solids from 8.98 per cent to 8.74 per cent. (In Scotland, however, quality remains high.) Certain seasonal falls in composition have been increasing; during the later part of the winter, bulked milk has frequently fallen below the presumptive legal standard of 8.5 per cent of non-fatty solids, although there is no question of water having been added illegally.

Can we control the factors affecting the composition, thus reversing past trends and giving the consumer a better product? Professor Kay asked, and added that we do in fact know a lot about several of the factors affecting the level both of milk fat and of non-fatty solids. Both can be bred for within any breed of cows and, by careful selection of dams and sires, non-fatty solids could be raised or lowered more quickly than milk fat. But here is a real difficulty; for some milk producers it is far from easy to have their milk assessed in terms of solids-not-fat. If we are to take serious practical steps to improve milk quality, one of the most important requirements is a nationally available service for determining the solids-not-fat of the individual cows. It is no more difficult or time-absorbing to determine solids-not-fat than to determine fat, given that the analyst must have reasonable skill and experience and the necessary, and not very expensive, equipment.

Turning to the effect of feeding on milk quality, Professor Kay said it was only within the last twelve years that it has been clearly shown that the plane of nutrition of the cow very significantly affects the quality as well as the volume of milk secreted for dairy. Experiments at the N.I.R.D. have shown how a reduction of 25 per cent in the starch equivalent of an otherwise normal diet, could in a few days bring the solids-not-fat content down to below the legal minimum; a reduction of 40 per cent of protein in the diet causes a materially smaller fall. "It was a surprise to realize that the principal effect on milk quality of a shortage of carbohydrate in the diet was a fall in milk *protein*."

After advocating a system of payments on the basis of total solids, Professor Kay concluded: "As consumers of milk, too many households have, of recent years, and especially in winter, been paying a fairly high price for added water—quite honest, physiological water, and not criminal water from the tap, though otherwise of a very similar composition to tap-water.

"It seems to me it is really up to the whole dairy industry to see that this unfortunate lowering of quality is, in the immediate future, halted and then reversed. Let the housewife, if she wishes, put tap-water into the milk after

she has purchased it, but let us stop so many of our cows from diluting honest milk before it reaches her. And the fairest, most equitable and quickest way to accomplish this is by paying the producer on the quality of the milk he sends to market. For, if all producers are simply paid on volume, the producer of low quality milk is riding on the back of the man who takes the trouble to produce good quality milk. To produce a gallon of milk costs the latter more than the former. Why should he not be paid accordingly?"

Marketing of Home-Grown Timber The United Kingdom offers a huge market for timber. Indeed, apart from wood for fuel, we use more timber per head of the population than any other European country except Scandinavia. But our woodlands supply only a very small proportion of our needs. Until recently most of this home-grown supply has come from privately-owned woodlands, but the output from the woodlands of the Forestry Commission is beginning to increase quickly. Thus the private timber-grower faces competition from both the overseas producer and the Forestry Commission, and he is poorly organized to meet it. Private forestry consists of a large number of separate and relatively small undertakings, all conducting their business almost entirely on an individual basis. Furthermore, forest products are not covered by the provisions of the 1947 Agriculture Act, and the forester, unlike the farmer, has no assurance that increasing costs will be compensated by any corresponding rise in income.

The report of an official committee appointed three years ago to "consider what measures might be taken within the home timber industry to improve the arrangements for marketing produce from privately-owned woodlands" has recently been published by H.M.S.O. under the title *Report of the Committee on Marketing of Woodland Produce, 1956.** It surveys the production, utilization and marketing of home-grown timber and analyses the prospects before the private owner. It draws attention to such possibilities as the readiness of the furniture industry to use more home-grown hardwood, provided it is prepared to the desired specifications, and to such handicaps as the relative lack of pulp plants in this country. When discussing the difficulties which face the private forester, it emphasizes the value of co-operative forestry societies to private foresters. An increase in the maintenance grants from the Forestry Fund is recommended, but available financial data are insufficient to justify recommendations for or against price support.

The Committee concludes that the efficient marketing of home-grown timber from private woodlands requires the creation of two new bodies—an effective organization of woodland owners and a central consultative committee representing the principal interests concerned. The first is necessary to secure improvement in both production and marketing, and the second to ensure that the supply of timber from private woodlands is integrated into the total national output and, more generally, that the whole question of producing and marketing timber in the United Kingdom is kept under continuous review.

In principle, this report deals only with one aspect of one section of our forestry. But the background information and the arguments which the Report contains make it essential reading for anyone interested in our forest resources and their place in the national economy.

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* Price 4*s.* 6*d.* (4*s.* 9*d.*) by post) from H.M. Stationery Office, or through any bookseller.

Agricultural Scholarships Fifty-six scholarships for courses in an agricultural or allied subject, tenable at university departments of agriculture, agricultural colleges and farm institutes, are being offered by the Ministry of Agriculture, Fisheries and Food. The scholarships are open to the children of agricultural workmen or of rural workers (including working bailiffs and smallholders) whose means and method of livelihood are comparable with those of agricultural workers, and to persons who have themselves been paid workers on the land for at least three years.

Details of the scholarships are as follows:

Twenty Senior Scholarships for degree or diploma courses in an agricultural subject (degree courses at university departments of agriculture, diploma courses at the agricultural colleges and the Essex and Lancashire Institutes of Agriculture); or for courses in veterinary science at veterinary colleges.

Thirty Junior Scholarships tenable at farm institutes for courses not exceeding one year in duration, in agriculture, horticulture, dairying or poultry husbandry.

Six Extended Junior Scholarships for those who have already held junior scholarships.

The value of an award is dependent upon the circumstances of the parent or guardian, and of the applicant, the senior awards being comparable with State scholarships. Selection will normally be made by interview. Candidates, who must have reached the age of 17 by September 30, 1957, must be able to satisfy the selection committee that they will benefit by a course of instruction and that they intend to follow an agricultural career on completion of their training.

Application forms and full details may be obtained from the Secretary, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1, or from the education offices of county councils. The latest date for the receipt of completed applications is February 28, 1957.

New Parliamentary Secretary Mr. J. B. Godber, M.P., has been appointed as the Joint Parliamentary Secretary (Commons) of the Ministry of Agriculture, Fisheries and Food in succession to Mr. G. R. H. Nugent, M.P.

Mr. Godber, who will be 43 years of age on March 17, was educated at Bedford School and entered his family's farm and nursery business in 1932. He became Director in 1935 and subsequently expanded the business on the horticultural side. In 1946, he became a County Councillor for Bedfordshire, representing an agricultural area where he took a special interest in smallholdings. He has served on many N.F.U. committees and was chairman of the Bedfordshire Horticultural Committee and of the Parliamentary Committee of the N.F.U.

Since 1951, when he became an M.P., Mr. Godber has given up general farming but he has maintained an interest in horticulture and was elected a member of the Tomato and Cucumber Marketing Board. From 1952 to 1955 Mr. Godber was Parliamentary Private Secretary to the Parliamentary Secretary to the Ministry of Labour, and from June, 1955, to January, 1957, Government Whip.

IN BRIEF

Dairy Herds and Self-Sufficiency

Speaking at the luncheon and prize distribution for the 18th BOCM National Milk Yield Competition, MR. GUY CHIPPERFIELD, C.B.E., the Company's Chairman, referred to the degree of feeding self-sufficiency being practised within the entrants' dairy herds. "From our survey," he said, "I can tell you that 92 per cent are growing their own maintenance requirements on their own farms, and at least half are providing one gallon or over in addition to maintenance from home-grown foods. The other half are typical of the widespread dairy farmers in this country with farms of 50 acres or less; the sort who are typified by the man who remarked, "All I get comes from udders", and it is a tribute to them that a large proportion of these comparatively small-acreage farmers are growing their own maintenance ration. To ask them to provide a gallon of production as well is virtually impossible with such a limited acreage, and those who advocate greater self-sufficiency must remember that the large majority of dairy farmers in this country are not ranching but working under severely limited conditions in respect of available land, and it is they—you, in fact—who are responsible for keeping the national milk average *up*. However, compounds play a prominent part in redistributing the home-grown grain in the form of scientifically prepared feeds."

Keep Pigs Warm

Warm, dry housing for pigs, especially when young, is a commonsense provision when we remember that Nature has provided little protection for them against temperature changes. The normal body temperature of a pig (102-103°F) is about the same as that of a sheep; yet the latter's fleece, in contrast to the sparse coat of a pig, is a particularly good insulation against the customary inclemencies of the English climate. A cold pig is a hungry pig and therefore it requires more feed—and that means higher costs of production. To get the highest feed conversion rates, see that the house is well insulated, free from draughts and kept at a temperature of 60-65°F.

Very young pigs, that is from birth to 3-4 weeks, require a much higher temperature than grown pigs. The temperature of farrowing pens should not be allowed to fall below 65°, and perhaps should be as high as 75-80°F. Above all, keep the temperature constant.

Broilers in Canada

Canadian poultry-keepers have taken a keen interest in broiler production during the last ten years. Compared with pre-war, the value of the industry's output has increased fourfold, production has become highly specialized, processing is done on a gigantic scale, and marketing methods are being looked at critically. Eviscerated and cut-up chicken is today as much a standard product on most self-service counters as sausage and bacon. And the consumer is becoming more demanding.

Turkey broilers have followed the same pattern as chickens over the last five to ten years, and marketings through Canadian processing plants have increased from 18 million lb in 1951 to 41 million lb in 1955. Turkeys used to be produced primarily for Christmas and Thanksgiving, and although the biggest volume is still marketed at those seasons, the birds are now being

sold more generally throughout the year. The smaller turkey is competing actively with the roasting chicken and has influenced the trend toward broiler production.

Sex Control

Pre-determination of the sex of animals has long been a biologist's dream. In mammals, the male is responsible for the sex of his offspring, and in the normal course of events the two types of sex chromosomes contained in the sperm are equally frequent, thus ensuring an approximately equal distribution of the sexes.

A recent suggestion that the acidity of the blood has an effect on sex chromosomes has aroused the curiosity of breeders, but when the evidence is examined it boils down to two laboratory experiments on rodents. In one, mice were successfully selected for alkalinity or acidity of their blood. The acid line was found to produce an excess of females (about 60 per cent) and the alkaline one an excess of males (again about 60 per cent). Apparently only the blood value of the male was of importance in determining sex ratio; the female values had no effect.

The other experiment concerned rats bred at different altitudes. At medium heights an excess of females was born, whereas at over 14,000 feet there were more males. Now in man, at any rate, it is suspected that altitude induces alkalosis, but it is difficult on this theory to explain the different results at the two heights.

The possibility that the effect on sex ratio in both these experiments is in fact attributable to alterations in the conditions that also produced changes in blood acidity cannot be excluded, and the conclusion that sex can be controlled by altering the blood acidity of sires must clearly be regarded as unwarranted on the basis of existing information.

Dr. W. P. Jaffe in "Pig Farming"
(February 1957)

Reduced-fat Cheese and Unwashed Butter

New Zealand is experimenting with making a reduced-fat cheese. Milk in New Zealand has a butterfat content of between 4 and 5 per cent, and the purpose of the experiment is to reduce the fat content of the cheese to 52 per cent fat in dry matter by skimming some of the fat from the milk before manufacture. For some reason, however, the texture of this reduced-fat cheese has tended so far to be more open than that of cheese made from whole milk.

Also from New Zealand comes information about experiments that are being conducted to determine the effect on butter quality by processing without first washing the churned granules of butter with cold water. The washing process, which removes all traces of buttermilk, has been under attack recently, on the grounds that it also removes non-fat milk solids.

New Appointment

Mr. M. Whalley Taylor, M.B.E., M.A., formerly Chief Poultry Advisory Officer for the West Midland Province of the National Agricultural Advisory Service, has been appointed Agricultural and Food Attaché to H.M. Ambassadors at Copenhagen and The Hague. He will also hold a watching brief on technical agricultural developments and food trade trends in Western Germany. He will be taking up his appointment in Copenhagen on or about January 28. It will be remembered that Mr. Whalley Taylor

served as Deputy Agricultural Attaché at the British Embassy in Washington from 1949 to 1953.

Bull Progeny Testing in Denmark

Three progeny testing stations were started in Denmark in 1945; there are now thirty-two. Over the same period the number of bulls tested yearly has increased from 6 to 93, but the actual number of bulls in the country has been reduced because of the increasing use of artificial insemination. Thus is measured the extent to which the various bulls can pass on to their progeny the capacity to produce a large milk output with a high fat content. At the same time, various characteristics, such as ease of milking and the shape of the udder are also examined. Decision as to which bulls to use and how heifers will be selected for investigation is a matter for the cattle breeding station.

For the purpose of testing, 17 to 20 heifers are selected, not according to the ancestry of the mother and her milk records, but according to age and the time when she will calve. The heifers must be due to calve between October 1 and November 15, and be 2½ years old at the time of calving. They are brought to the station about the beginning of September, and are returned to the owners when the average number of milking days for the herd as a whole is 304. When the test year is completed, the results are checked and a report on them is distributed to the cattle breeding associations and their advisers, and to the owners of the heifers.

The yield of the daughters at the testing stations is not compared with the yield of their respective dams, since it is held that the daughter will inherit half her characteristics from the bull and half from the dam.

Eskimo Geese

Eskimos are trying to raise their own geese at Ungava Bay, Quebec. The Arctic and sub-arctic regions of Canada are natural nesting places for several species of wild geese, and hitherto the Eskimos have simply shot such birds for food as they were required.

Last summer thirty-five goslings of the Pilgrim breed were flown in from Ottawa, given three weeks on chick starter, mash, grass and moss, and then left to fend for themselves on a poor native range. At night the birds were brought in from the range to a snow-fence enclosure and fed a sprinkling of grain.

Even under such spartan conditions, the birds averaged 11.3 lb at 16 weeks old, a result which prompts the experiment to be continued.

Rabbit Clearance on non-farming Land

One of the difficulties met with in the anti-rabbit campaign has been the clearance of rabbit harbourage on non-farming land. Therefore the Government is now offering a grant of up to 75 per cent of the cost as an incentive to owners or occupiers of non-agricultural land who would derive no economic benefit from clearance. Where clearance is not practicable, these grants may be given for fencing-in rabbit-infested areas. An undertaking must be given by the owners and occupiers concerned either that the scrub will not be allowed to re-establish itself or that the fencing will be kept in good repair. Details of the grants and advice on the best method of dealing with a rabbit-infested area can be obtained from the Ministry's County Offices.

BOOK REVIEWS

Farm Buildings: Conversions and Improvements. W. G. BENOY. Crosby Lockwood. 28*s*.

The publication of this book comes at a time when building problems on the farm are emerging from the shackles imposed by scarcities of materials and war-time restrictions. It is therefore appropriate that a practising architect, specializing in agricultural buildings, should produce this introduction to the " new look " of this complicated and highly individualistic subject.

Mr. Benoy has confined his attention to the conversion and improvement of fixed equipment on existing holdings. His knowledge of the theoretical and practical sides of his profession are evident in the solution of the various problems illustrated in the book, and readers will no doubt find encouragement to attempt their own solutions to these problems. Therein lies much of the merit of these examples.

The emphasis throughout is on modern trends in farming practices and equipment, and many accepted customs are exploded. The importance of selecting materials and their relevance to problems of maintenance and function are underlined. Mr. Benoy anticipates the influence of future developments in mechanization, and rightly advocates flexibility of planning within a framed structure. He does not, however, overlook the part which the highly specialized building, such as the piggery or grain store, plays in the economy of the farm.

Building materials and their uses are dealt with in an essentially practical manner, reminiscent of the late Edwin Gunn, one of this country's most experienced agricultural architects. In all probability, Mr. Benoy's influence in this field will, in the future, be no less than was that of Edwin Gunn in the past.

The absence of any reference to costs may be regretted by some, but any attempts to relate prices to such individualistic work as is described in this book might prove misleading and even dangerous. The author has wisely resisted the temptation to give such information, knowing that without price stability in the present world, such data would be valueless as soon as they had been presented.

In style, the writing is unpretentious. Mr. Benoy states his case clearly and concisely and, although not minimizing his problem, does not complicate it unnecessarily.

The illustrations are well chosen. The line drawings are presented with economy and clarity, although it might have been helpful if greater distinction had been made between new work and old.

A " professional " book, which the amateur can enjoy with profit to himself, this latest contribution deserves a prominent place in the bibliography of farm buildings.

F.W.H.

Fisons Grassland Book. W. D. CARSON. Fisons.

Books on grassland husbandry have poured from the press in recent years. Have we reached saturation point or is there room for more? As the author rightly remarks, there are many farmers " who do not appreciate yet that there is money in good grass ", and while this indifference to the enormous potentialities of our grasslands remains, there must be a case for the frequent repetition of a now well-worn theme. Mr. Carson comes straight to the point in his first chapter in which he deals with the relationship between grassland farming and the farmer's pocket. Within the limited scope of 54 pages he sets out, in a condensed but very readable form, most of the now generally accepted " do's and don'ts " of modern grassland husbandry.

In such a small book it is difficult to do justice to all the technical and economic aspects of the subject. Although the importance of a long grazing season is stressed, the suggestions for implementing this are confined to the use of short-lived ryegrass swards for early bite, and the use of kale or special foggage mixtures for early winter grazing. There is no reference to the now common practice of extending grazing into November and December by the proper management of suitably responsive leys. This is undoubtedly an opportune time to examine haymaking practices critically and to draw attention to other alternative methods of conservation. Therefore, mention might have been made of the future possibilities of barn hay drying and mechanized tripoding.

This book, which is lavishly illustrated, could be described as a pocket guide to profitable grassland farming. It is obtainable free from Fisons Ltd., Harvest House, Felixstowe, Suffolk.

S.C.

Gilbert White in his Village. CECIL S. EMDEN. Oxford University Press. 15*s.*

Almost everyone who claims to be a naturalist, or just a lover of the countryside, must have read Gilbert White's *Natural History of Selborne* once if not several times. Those, especially, who continue to browse in it from time to time must have formed some concept of White's personality, and, in consequence, could claim a nodding acquaintance with that remarkable little man. But few would go further than that—or *could* go further—for his personality does not radiate through his prose as with Cobbold or Surtees. His writings, whether in *Selborne* or in his Journals, Calendars or Letters, invite attention to the matter in hand rather than to the writer. Only after diligent research in scholarly calm, in the manner of White himself, do the facets of his character fall into place: and this is the task Cecil Emden has undertaken for us. White emerges as a busy, kindly, man, with a deep concern for his fellow-villagers—well past the bounds implied by "parishioners"—and with an unfailing interest in natural phenomena of every kind in the garden, fields, woods and streams around him. The interdependence of these two guiding principles of White's life is the underlying theme of the book.

It must be admitted that the generous sprinkling of the text with references is a little tiresome for the reader, however inevitable it may have been in a book of only 140 pages. Nevertheless, even if we do not happen to have *Selborne* at our fingertips, the tale is still pleasantly cursive. It leaves us with the comfortable feeling that we have come to know a friend a great deal better, to say nothing of Thomas the gardener and even Timothy the tortoise. But personally I should have liked to have learned a little more about White's house, furniture and personal possessions: his garden and its environs are described in some detail.

Fifteen delightful drawings are included as chapter heads. In them, Lynton Lamb succeeds in catching, with brilliant economy of line, not merely a seventeenth-century flavour but also the sheer intimacy of his subject. Those for Chapters XI and XIV are especially enchanting. Indeed, the whole production of the book is most commendable.

E.A.R.E.

Farm Electrification. ROBERT H. BROWN. McGraw-Hill. 52*s.* 6*d.*

On many occasions in recent years we in Britain have been told about the electrified farms of America, and have been led to believe that we are far behind the Americans in farm electrification. But Mr. Brown, who obviously has been closely connected with electro-agricultural development, is apparently by no means convinced that farm electrification over there has progressed much from its embryo stages. Apart from some farm lighting, electrical amenities are all too often confined to the farmhouse.

It appears that American farmers, unlike their counterparts in this country, do not enjoy the benefits of many advisory aids in branches of their industry. Therefore, American agricultural students and young farmers need to acquire a great deal of specialized engineering knowledge with a view to carrying out their own installations unaided. Mr. Brown has set out to supply a great amount of the detail that is required in such circumstances, and, incidentally, to promote the wider use of electricity on farms.

Technical information from abroad is always of interest and often of help. Such is the case with Mr. Brown's book. It contains much that can confuse readers, but, at the same time, his treatment of the principles of electric lighting, heating, and particularly power, will be useful to United Kingdom readers. As is to be expected, care is necessary in considering the demands of different climates and crops. Moreover, American standards, terminology and equipment often differ from the British. Some practices, too, that are quoted naturally by Mr. Brown as commonplace, are not so over here; for example, copper and silver connections do not have special significance in British electrical installations.

It is surprising that, having regard to the alleged paucity of the development, Mr. Brown has not dealt with several aspects of single- and split-phase load development. The economies of such systems, which are greatly facilitating rural electrification in Britain, must surely be needed in America if Mr. Brown is to see much increased use of electricity on existing networks.

Readers will be disappointed to find that many of the illustrations are of little help, and that some of the diagrams are incomplete. Students will also have their burden increased by the many errors in indexing. It is to be hoped that these matters will be rectified in future editions.

R.A.B.

Soil Sterilization. W. J. C. LAWRENCE. Allen and Unwin. 18*s*.

The practice of soil sterilization developed from the investigations at Rothamsted Experimental Station by Russell and Petherbridge into the cause of "sickness" in glasshouse soils. After 1912, little work was done on the physical and engineering aspects of steaming soil. We had to wait until recent years for the work of the National Institute of Agricultural Engineering and the John Innes Horticultural Institution to greatly increase our knowledge of this process and demonstrate the inefficiency and wastefulness of many present practices.

Mr. Lawrence has set himself four objectives: to present in a readable manner the theoretical background to soil sterilization; to describe the sterilizing operation and equipment used; to provide a list of publications and reference data; and to review existing practices in the light of recent research. He is to be congratulated on his achievement. His recommendations, if applied, could lead to a marked increase in efficiency and a lowering of costs.

The book describes, by clear and logical development, the steaming process, starting with the effect on the soil components, and going on to deal with the effect on plant growth, the properties of steam, the injection of steam into the soil, and the apparatus and methods used. In addition, there are chapters on sterilization by chemicals and the use of soil fumigants in controlling nematodes.

There are only a few minor points in this book calling for criticism. Thus no mention is made of the use of P.V.C. sheeting as a cover; only the more expensive P.V.C. coated rayon is described. The conventional steam drier is dealt with in detail, but not the more efficient centrifugal driers which have been developed recently. The section on lagging mains is a little laboured, and I should have thought that felt strips might have been suggested as a cheap and effective solution to this problem. Six-ply rubber steam hose is very expensive, and for many purposes light duty hose might be used instead. Throughout the book, an 18-inch pipe spacing is recommended. As the National Institute of Agricultural Engineering's recommendation of spacing not exceeding 1½ times the depth is quoted, it is difficult to understand why this is not followed. It can also be argued that the reducing valve has a much wider application, in general practice, than Mr. Lawrence admits.

G.F.S.

Our Villages: A Survey of Amenities and Public Services in Rural Areas by the National Federation of Women's Institutes. Edited by CICELY MCCALL. National Federation of Women's Institutes. 2*s*.

This is a brief well-presented analysis of the questionnaires completed in the third survey of rural conditions, carried out in January 1956 by the members of 6,000 Women's Institutes. Although such a survey cannot provide a complete statistical picture, the returns made by approximately three-quarters of all the Institutes in England and Wales give a useful indication of the main needs of our rural areas, as seen by the countrywoman. In addition, by comparing the results with those from the two previous surveys, it is possible to assess the progress made in providing better services and amenities in the countryside. Thus sewerage has now replaced piped water as the primary need in many villages; housing requirements have greatly declined, and better street lighting, road safety and rural transport have become increasingly urgent.

General credit is given to local authorities for housing having become a relatively minor need, but complaints are made by some Institutes about the design of the houses provided. These suggest that many architects and local councils have little conception of the needs of the country housewife. It seems incredible (in this enlightened age) that a "wash-house" could be erected without ventilation, piped water or power plug, when both mains services are available in the house. Yet such is the complaint made by no less than eight county federations.

The experiences summarized in the report of this survey leave no doubt that, apart from its varied social acctivities, each Women's Institute has a vital civic function to perform in clarifying the true needs of the community; in many instances it can do more than this and take direct action to improve living conditions in the countryside.

Copies of the survey (price 2*s*. 2*d*. by post) may be obtained from The Secretary, National Federation of Women's Institutes, 39 Eccleston Street, Victoria, London, S.W.1.

J.O'C.

TEIC 131

Laboratory Control of Dairy Plant. J. G. DAVIS. Dairy Industries. 30*s*.

Probably not less than 85 per cent of the liquid milk supplied to the consumer is subjected to heat treatment, either by pasteurization or sterilization. The distributive side of the dairy industry is primarily concerned with the collection of liquid milk and its subsequent pasteurization, bottling and distribution. This involves the use of plant of all kinds, some of which is so intricate that it is necessary to employ skilled plant engineers. All the plant must be maintained in a state of thorough cleanliness—using this term in the bacteriological sense—and this calls for skill and care on the part of the dairy manager and staff, and a system of plant control which will also enable faults to be quickly and easily discovered. Over the years, a system of control of dairy plant has been evolved which, when operated fully and efficiently, ensures that the milk is of the desired standard of hygienic and keeping quality.

Dr. Davis has admirably covered this important branch of dairy technology. Dealing first with the purpose of plant control, he passes in a logical sequence to a consideration of the fundamental principles in the cleaning and sterilizing of dairy plant; the methods of assessing the degree of cleanliness and sterility; plant control; and the setting and checking of the instruments used for these various purposes. Then, he deals in detail with such special matters as detergents, sterilants (why must we use these American terms?), water, effluents, and refrigerants. There are useful chapters on steam raising and on corrosion, and at the end a review of the economic and legal aspects of the subject.

This book is the second of a trilogy by Dr. Davis, and is well up to the high standard set in his *Milk Testing*, now firmly established as one of the authoritative works on the subject. To all those who are in any way concerned with the dairy industry, *Laboratory Control of Dairy Plant* will be of great interest, and to those responsible for dairy plant it is an essential handbook.

S.S.

Principles of Farm Machinery. ROY BAINER, R. A. KEPNER and E. L. BARGER. Chapman and Hall. 70*s*.

TEIC 17

There is always a risk that a book on farm machinery will be either little more than a catalogue of machines, or a text-book of elementary mechanics with an agricultural flavour. The authors of this book have been successful in avoiding both these errors. They have produced a volume dealing concisely, but effectively, with the principles involved in agricultural machinery of different types.

The book is primarily intended as a text-book for students, and it is certain to be well received as such. The first three chapters, which deal with the functions of research and development, the capacity and operating costs of machines, and the materials of construction, will be particularly useful in helping students to get the subject into focus. After that, the authors proceed by way of power transmission and tillage force analysis to tillage equipment and, finally, to the machinery which is required for different crops and processes.

Designers, research workers, and others concerned with agricultural machinery, will find the book attractive as a reference volume. Its value is certainly enhanced by the lists of references to original papers which are given at the end of each chapter.

The only criticism that is likely to be made is that the terms used to describe components will not always please every reader. This is because the authors have rejected the practice of giving alternative names to components and, instead, have firmly decided what to call each. This leads to no confusion in the book, and it would be unfair to blame the authors for a difficulty that is inherent in the subject.

H.J.H.

Farm Organisation and Incomes in South West England, 1954. (University of Bristol, Department of Economics Report No. 96). S. T. MORRIS and H.W. B. LUXTON. 5*s*.

No farmer will need to be reminded that the weather in 1954 was appalling, and that this year marked the first stage in the process of decontrol. How these factors affected net incomes is shown in this report.

The report begins with a detailed study of the physical conditions of farming in the Province, and this is followed by the financial results. For the sake of comparison, these are shown alongside those for 1953 (for a sample of 215 farms) in a series of concise and excellently designed tables. Taken together, these describe the physical and financial anatomy of farming in the South-West.

It is perhaps the financial tables on which attention will be focused. These show that the output of livestock products was increasing and prices were buoyant, suggesting that decontrol had little effect in south-west England. With crops, the picture is very different. Here, the bad weather took its toll and output was down by 20 per cent, as also were net incomes. There were varying degrees of adversity of course. Some farmers on the poorly drained lands of North Devon and North Cornwall lost both their hay and corn crops, whereas the dairy farmers in the drier, hilly country of East Devon suffered very little. But, on the whole, 1954 was one of those years that farmers want to forget—the only comfort they can glean from this report is that the statistics do at least reflect their misfortunes!

As in the 1953 report (No. 84), there is a useful series of tables showing management factors, and the booklet is again well produced and illustrated.

B.E.C.

East Malling Research Station Annual Report, 1955. 12*s.* 6*d.*

As usual, the East Malling Report is conveniently split into four parts: a summary of work on the experimental farm, a review of the research programme, a number of research reports and reviews (including the Eighth Amos Memorial Lecture), and bulletins for fruit-growers.

The account of the station's experimental fruit crops during the 1954-55 season, though inevitably abbreviated, gives a very good impression of the tremendous range of work being done at East Malling. It includes details of the routine spray programme, the yields of fruit, and results of investigations on the boxing and gas storage of apples. In order to control Apple Mildew in the stoolbeds, the whole of the nursery area was sprayed with lime sulphur, and it is interesting to note that the tractor-mounted boom sprayer used proved to be more economical and as effective as a hand-lance.

The four fruit-grower's bulletins deal with the virus-tested rootstocks and varieties of apples and cherries expected to be available at East Malling in 1956 and 1957; the method used at the station to obtain virus-free strawberry runners; insect predators of fruit tree pests; and the leaf-count method of thinning apples.

Fruit-growers will be particularly interested in a report on observations of grassed and cultivated orchard plots. In trials with Cox's Orange Pippin it was found that the blossom suffered less frost damage on grassed than on cultivated plots, and storage losses were less in fruit from grassed plots. A study of soil moisture in grassed orchards confirmed that the recommendation to mow the grass frequently to conserve moisture is well founded. In another experiment, the depth to which the soil dries out under grass was found to vary with the species of grass used. Black currant cuttings taken from stools appeared to strike as easily and grow better than cuttings from fruiting bushes.

The Amos Memorial Lecture, given by Professor T. Wallace, comprised a retrospect of manurial practice in British fruit growing. Attention is drawn to the special importance of potash manuring for fruit, particularly in preserving an adequate balance with other nutrients, notably nitrogen and magnesium.

A.J.L.L.

List of Research Workers 1956. Commonwealth Agricultural Bureaux. 42*s.*

The 1956 edition of the *List of Research Workers* will be warmly welcomed by all who proved the merit of the previous edition of this valuable reference book. The list is extensive and covers research workers in the United Kingdom, the British Commonwealth, the Republic of the Sudan and the Republic of Ireland. It is divided into four parts: the first two give names, addresses and telephone numbers of research workers in agriculture, animal health and forestry, and, wherever possible, a brief statement of the particular line of research with which the worker is concerned. The second two parts are indexes—one of institutions and the other nominal.

It seems a pity that a reference book of this quality should have only a paper cover, for, within its sphere of interest, no desk is likely to be complete without it.

The List is obtainable through any major bookseller, or direct from the Commonwealth Agricultural Bureaux, Central Sales, Farnham Royal, Buckinghamshire.

J.M.E.

BOOK REVIEWS

The Finance of Farming in Great Britain. S. G. HOOPER. Europa Publications. 25*s*.

The dust cover of this book reminds us that there has been no comprehensive review of the methods of financing British agriculture since the publication of Sir Ralph Enfield's *Report on Agricultural Credit* in 1926. For this reason, if for no other, Mr. Hooper's book is welcome. It gives us, for the first time in such detail, an insight into the working of the bank manager's mind in his relationships with his farmer customers. This is the most interesting, and the most original, contribution which the book has to make.

In particular, the discussion on the typical credit needs of different types of farmers, and the graphs of seasonal credit requirements, are very interesting and valuable. In the chapters dealing with bank lending, Mr. Hooper is on his home ground and he obviously enjoys himself. He deftly dissolves the illusion that the "good old days" of small country banks were more advantageous to the farmer, and he quotes the increasing share of total bank advances going to agriculture to support his claim that "the policy of the banks today seems to be more generous than it has ever been to the farming community".

Unfortunately Mr. Hooper has served the best wine first, for he follows with a long section on the state of British agriculture and the broad financial structure of the industry. It adds nothing new and must already be very familiar (or at least one would hope so) to the majority of his banking colleagues, for whom the book is primarily intended.

After an over-lengthy digression on farmers' balance sheets and the working of the 1947 Act, and before concluding with his ponderous tail of appendices (52 pages), Mr. Hooper allows himself an all too brief glance into the future. He would like to give his professional kith and kin a clean bill of health, and he quotes Sir William Gavin's article in the *Times Agricultural Review* of December 8, 1952, in justification. But such a conclusion would be too tame. Instead, he suggests that if any improvement is needed in long-term facilities, the Agricultural Mortgage Corporation should be modified and adapted as necessary, and if there is felt to be an unsatisfied demand for mid-term credit, the commercial banks might themselves set up a corporation on the lines of the Industrial and Commercial Finance Corporation. It is a pity that Mr. Hooper did not discuss the alternative suggestion made by Sir William Gavin in his article—that the banks should be prepared to lend at least a part of their money for specific periods of up to five years. Mr. Hooper's views on this would have been worth hearing.

Perhaps the most encouraging thing about this book is that it was written by a banker for bankers. This is a sign of the increasing interest which bankers generally are taking in the affairs of one of their most important customers. If there is little new in the content of this book it shows, nevertheless, a freshness of approach which augurs well for the future relationship between the banker and his farmer client.

J.H.K.

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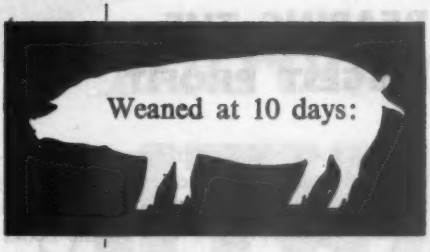

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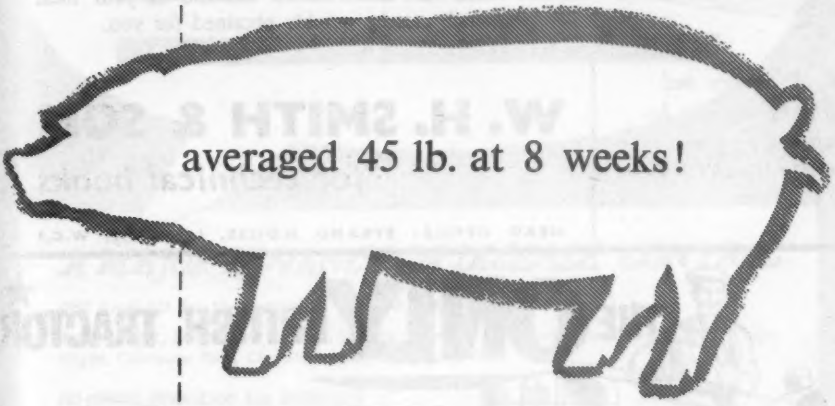

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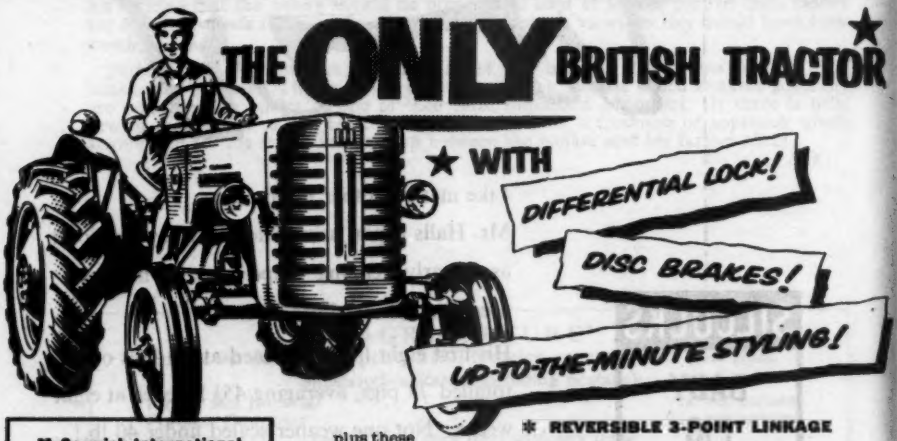

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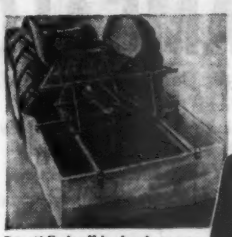

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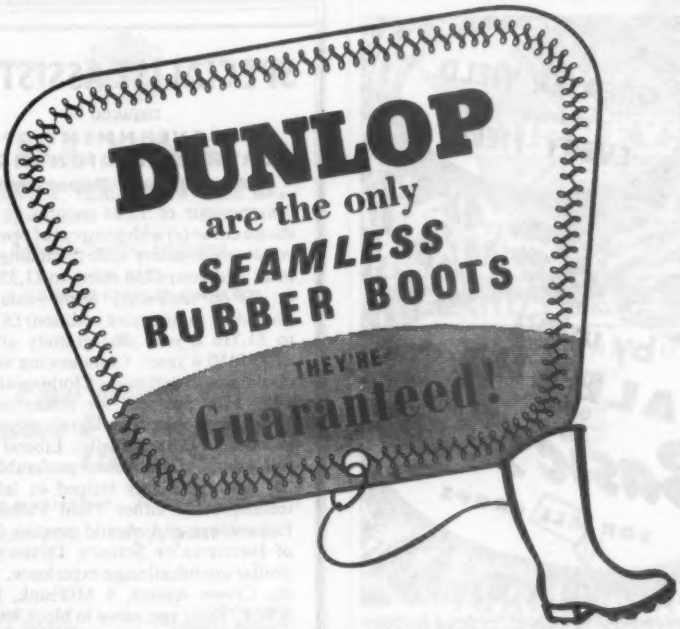

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